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ABSTRACT This study was initiated in 1964 under the sponsorship of the Cooperative Research Program of the Office of Education to develop and supply data useful to policy makers and planners of training programs for research, development, and diffusion personnel in education. The first task was the construction of a logical structure to account for the formally defined institutional roles, from which a picture of the research community in 1964 could be drawn and future demand projected. Chapter 2 provides a general description of the community in 1964, analyzing it by institutional settings and researchers' roles, estimating the actual number of researchers and the number being added to the community. Chapter 3 deals in detail with the procedures used, funding projections, and personnel projections. Chapter 4 considers the effects of curtailment of funds for ESEA Title IV research training programs which will reinforce the existing pattern rather than enable new centers for training and roles for researchers to be established. Finally an attempt is made to define the roles which could be expected to emerge under the new research, development, and diffusion funding programs, namely director and staff of outside-funded development programs, technical support personnel, development project personnel, training personnel, and stimulators and coordinators of activities. Eight appendixes give additional documentation. (MBM)

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The research reported herein was supported by the
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PREFACE: BACKGROUND AND OBJECTIVES OF THE STUDY

When the plan for this study was first drafted, in May, 1965, it was conceived as a program of study and action. At that time, The Elementary and Secondary Education Act of 1965 was still a promise--a promise to effect massive changes in education, as Commissioner Keppel phrased it, "based on the results of sound research rather than on fashion, fad, and fancy." This project had as its focus of attention one aspect of the new ESEA--the training of research personnel for education.

Background of the Study

A flurry of research on educational researchers in the two years preceding ESEA had indicated that, in general, the state of the art in training researchers for education was crude:

1. Graduate programs in professional education had been heavily service- or practitioner-oriented and had placed little emphasis on research training.
2. Doctoral graduates in the field of education had been low producers of scholarly and research publications.
3. Social and behavioral scientists from the foundational disciplines on which education draws

(with the notable exception of psychology--primarily educational psychology) had had little interest in educational research.

These circumstances would have been sufficiently discouraging if the charge for research training under ESEA Title IV had been simply to develop an adequate cadre of university-based researchers who could add to what is known about the social process of education. But this was clearly not the case. The charge, as reflected in Congressional testimony on the Act, was to create a community of researchers, developers, and disseminators who were capable of bringing research directly to bear on public schools.[1] This broader charge led to concern about several other features of research training programs as they existed in 1965:

1. Existing models of research training programs for education were limited in number and scope. The best were represented by regular doctoral programs in departments of educational psychology, and the remainder had as their almost exclusive focus the preparation of the professor of education who would engage in some research while carrying out the multiple responsibilities of the professorship.

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[1] See Louis T. DiLorenzo, "Special Project Memorandum: Appraisal of ESEA Title IV Graduate Research Training Programs," New York State Education Department, Albany, New York, mimeographed, June 15, 1967, pp. 2-6.

2. Large areas of the research and development enterprise, ranging from the basic scientific investigator with a discipline base on the one hand, to development and diffusion personnel on the other, were in danger of being overlooked. Further, preparation of personnel for research, development and diffusion activity in settings other than the university was not reflected in extant programs.

The original project proposal noted these circumstances with alarm and predicted that unless steps were taken to intervene in the process:

1. "The programs will be dominated by a psychological approach to the training of researchers for education," although "no one seriously contends that psychology is _the_ vehicle for examining educational phenomena" and the expectation is being held out "that the new training programs will draw upon and involve the total range of discipline and cognate areas in the university."
2. "The programs will emphasize the training of the researcher who will be based in a university setting attempting to produce new knowledge, broadly conceived, about education," although ESEA, to which the program of training was purportedly directed, involves the school system directly

as a base for research and research-related activities.

3. "The programs will be planned, executed, and evaluated with only modest reference to changes in the field which have been provoked by recent developments in education," although "the research training program is expected to encompass research and research-related roles which will 'make the ESEA go.'"

The intervention proposed ranged from a study of emerging roles for research-related personnel in education, through the development of models and methods for assessing research training programs, to an action-oriented phase of activity directed toward formulating national policies and strategies for improving research training.

For a variety of reasons, personal and professional, the scope of the project was delimited during the period of project review to concentrate on what was believed to be the most urgent aspect of the problem; that is, the dysfunction which existed between conventional programs for the training of research personnel in education and the behaviors which would be required of a wide range of research, development, and dissemination personnel working "to make ESEA go." There seemed to be a paucity of information on the nature of these roles, the behaviors appropriate to the roles, the numbers of persons who would be required to fill the roles, and the implications of these data for trainers of R, D, and D personnel. In fact, the heart of the problem appeared to be the lack of information available to decision makers nationally and locally who would be called upon to make vital decisions in regard to the nature of training programs to be supported and operated under Title IV of ESEA.

At this point, the project was redrafted and it was noted that "the general objective of the study is to identify and define the varied roles which research and research-related personnel for education are filling and will be expected to fill over the next several years. Additionally, the staff will be interested in projecting the implications which this holds for the training of researchers for education. More specifically the study is expected to:

1. Identify existing and emerging roles and required skills and behavior for research and research-related personnel in education
2. Develop a comprehensive typology of research and research-related personnel for education
3. Project the implications of these roles and behaviors for the training of research personnel for education."

As the project developed, these objectives were never abandoned--a point with which we hope the reader will concur after perusing later sections--but a new emphasis emerged which appeared to have high social utility. The Title IV training program was pressured, as were all the programs of ESEA, to produce results immediately. The training program staff was placed in the position of mounting large numbers of training projects between the fall months of 1965 and 1966. It became increasingly evident that the prognostications of the original proposal would be affirmed essentially by the first round of proposals and programs since the programs most ready to go were those of a conventional nature. The social utility of this project as a short range aid to national or local planners of research training programs was reduced, since the demand for action was outrunning the capability of the staff to produce cogent and convincing data.

This did not, however, change the essential nature of the problem. It meant simply that the first round of training projects would, in all likelihood, be dominated by a psychological approach to the training of researchers, emphasize the training of the university-located "basic" researcher, and be generally unrelated to the other programs of ESEA.[2] This placed the researchers on this project in a position somewhat different from the one they had hoped (probably unrealistically) they might be in when viewing the situation twelve months earlier. By the fall of 1966 it seemed evident not only that a large number of conventional programs had been mounted but also that immediate future appropriations for research training under ESEA were to be curtailed. This meant that the existing programs would be _the_ programs for at least a temporary interval. With this respite in activity, the project staff decided that their mission might reasonably be defined as that of educational planners whose data might be directed toward long-range policies and plans for the development of appropriate training programs for educational R, D, and D personnel. This led to a new emphasis on quantitative manpower projections to supplement descriptive data on extant programs and emerging roles. A primary focus became manpower projections to assist in long-range policy and program development.

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[2] This "likelihood" was not left unexplored. The actual results of the first round of training projects (FY '66--implemented in academic year 1966-67) are summarized in detail in Chapter IV, including a project-by-project analysis undertaken by the staff of this study and summaries of concurrent investigations by Louis T. DiLorenzo (*op. cit.*) and Sam Sieber, *Analysis of U.S.O.E. Research Training Programs*, C.R.P. Project No. 7-8315, Bureau of Applied Social Research, Columbia University, New York City, 1968, 102 pp.

Final Statement of Project Objectives

The objectives of the study were reformulated at the end of the first year of project operation as follows:

> The general objective of this study is to develop and supply data useful to policy-makers and planners of training programs for research, development, and diffusion personnel in education. To achieve this

objective, the following sub-goals must be accomplished:

1. Project the demand for existing and emerging research, development, and diffusion roles in education.
2. Project the magnitude of the demand for particular types of research, development, and diffusion personnel in education.
3. Project the implications of these data for the recruitment, selection, and training of research, development, and diffusion personnel in education.

Actually this reformulation of objectives is more encompassing than those originally posited, since the manpower resource projections are impossible without a typology of research and research-related personnel in education and some effort to identify existing and emerging roles. It de-emphasizes the delineation of skills and behaviors requisite to the roles and substitutes for this a much more detailed manpower resource projection. Such information seemed more useful for planning and decision making purposes, particularly at a national level. To affirm this assumption, on September 1, 1966, a preliminary project report providing preliminary estimates of R, D, and D personnel required in education for 1971-72 was supplied on request to the Office of Education to assist the Office in developing a realistic budget request for the Title IV training program.

CHAPTER I

A LOGICAL STRUCTURE FOR VIEWING ROLES FOR EDUCATIONAL R, D, AND D PERSONNEL

The researchers were fortunate at the beginning of the study to have available a large body of normative data which had been collected very recently on the research community in the United States for the *National Register of Educational Researchers*.[1] These available data provided a shortcut method for describing the research community as it existed pre-ESEA, and forced an immediate confrontation with the problem of the logical structure of the entire investigation. The critical definition, from the point of view of the staff, seemed to be that of "role." The *National Register* data, for example, presented a normative picture of several thousand investigators, but how these questionnaires could be converted into a comprehensible picture for others to view (and a picture which would accommodate the feed-in of other data) was unclear.

The staff pursued the problem with two lines of attack. First, a literature search was undertaken to attempt to discover a definition of role which would fit the demands of this investigation and allow meaningful communication from this investigation to the broader social science community.

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[1] Bargar, Robert; Guba, Egon; and Okorodudu, Corahann, *Development of a National Register of Educational Researchers*, The Ohio State University Research Foundation, Columbus, Ohio, 1965, 139 pp.

Second, the staff engaged in extensive "empirical rummaging" with the National Register data to assess how, intuitively, one might discover "look-alikes" among the questionnaires. The intent of the second activity was to determine the dimensions of role which the staff would place in a predominant position in building a classification system for R, D, and D personnel.

A Definition of "Role"

Both efforts led to the conclusion that the only viable approach was adoption of a definition of role which relied on information from the official system, i.e., the manner in which the organization designates a role for the individual via official titles, job descriptions, tables of organization, and the like. The National Register data on which the project relied for its status picture included only these data; and an investigation of manpower resource studies in all fields indicated that "official role" designations were almost always used, since these data portray the only aspect of role on which stable, quantitative data can be obtained from secondary sources.

This created a problem in dealing with new or emerging roles, since the official sanction to support emerging or non-existent job descriptions is, by definition, tenuous. However, on closer examination this difficulty appeared to be more illusory than real. New or emergent roles have some tie to current practice unless they are wholly conjectural. For the most part, this tie is in the form of altered organizational objectives which can either be specified through perceptions now held by leaders in the field (e.g., local school districts require quality control engineers to assess the impact of innovations in operating settings) or through emergent trends in existing organizations (e.g., the formation of a D and D office in a school system). Such projections (or informed conjectures) gain credibility through juxtaposition with extant or emerging institutions and can be defined as roles in a quasi-official or projected system. An individual asked to describe a new role is hard-pressed not to use official designations, i.e., either a title or the relation of the role to an organization in which the role would be played.

For the purpose of this project, then, the definition of role became (1) a grouping of tasks or job assignments within an institution (2) which is designated by the institution through the use of a title, job description, or table of formal organization.

Dimensions of Role

This election of a definition for role did not solve the problem of determining what dimensions of the official description would be adequate, on the one hand, to distinguish meaningfully among R, D, and D personnel and, on the other, to serve best the interests of a manpower projection in this field. The staff attempted to group individuals from the National Register questionnaires into "look-alike" categories to arrive intuitively at the dimensions which seemed adequate to the purpose. Three dimensions were employed finally:

1. The institutional setting in which the job is performed. The institutional base was not only useful as an initial sorting strategy but was imperative in retaining the whole notion of official designation. The strength of this dimension in supporting requisite data analysis was manifest also when consideration was given to the manner in which manpower demands were placed on the field. Invariably, ESEA programs centered their strategy on altering existing institutional settings (e.g., creating demonstration centers in public schools through Title III projects) or on creating new settings (e.g., establishing regional educational laboratories) to achieve their designated objectives.

2. The job title or functional emphasis of the job in terms of organizational assignment. Job title is, at the same time, too broad and too narrow to describe this dimension; that is, some job titles, e.g., professor of education, include a widely divergent set of functional emphases. The professor of education may be a full-time instructor or a full-time researcher or, more typically, an individual who divides his time among research, teaching, and service. On

the other hand a job title may be so specific, e.g., assist-professor of early childhood education, that the individual is distinguished from his colleagues on the basis of one aspect of his functional emphasis--in this case substantive specialization. The aspects of organizational assignment which seemed to hold the greatest impact for manpower projections in R, D, and D were the percent of time spent in R, D, and D leadership responsibilities (e.g., program director) and in specialized assignments (e.g., coordinating or stimulating R, D, and D activities). Substantive specializations would have been relevant but could not be accommodated because they are inconsistently reflected in job titles and are too specific for most of the data available for projections.

3. The _relation to R, D, and D_ or the functional emphasis of the job in terms of research and research-related processes, i.e., research, development, and diffusion. This special component of role was essential for this study since the manpower demands were, by definition, to be related to R, D, and D activities. This dimension is clarifying in the sense that it distinguishes among a broad range of activities in or related to research and excludes non-research functions.

These dimensions of role and the basic logical structure for the study are depicted in Figure 1.

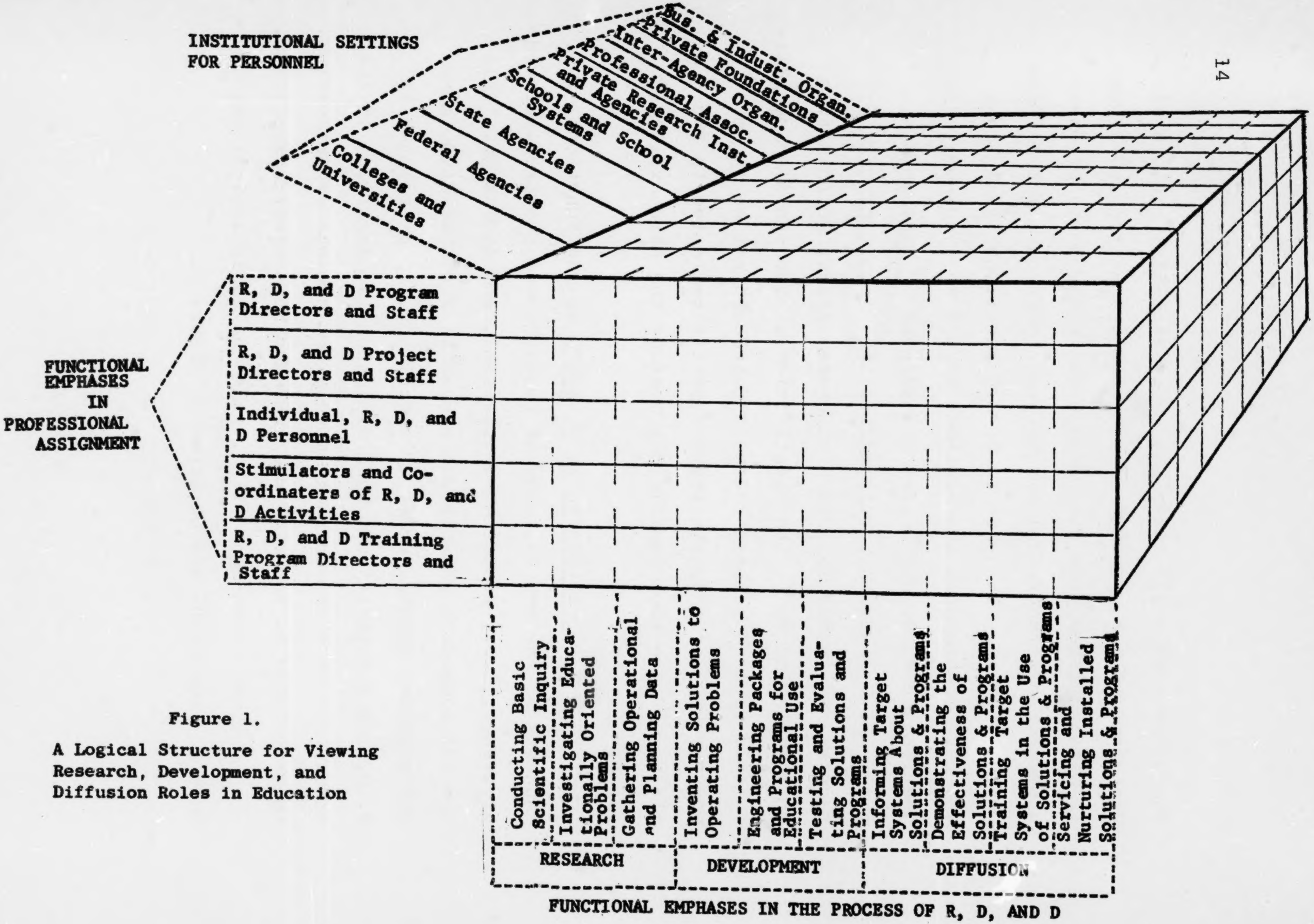
INSTITUTIONAL SETTINGS FOR PERSONNEL
Bus. & Indust. Organ.
Private Foundations
Inter-Agency Organ.
Professional Assoc.
Private Research Inst. and Agencies
Schools and School Systems
State Agencies
Federal Agencies
Colleges and Universities
FUNCTIONAL EMPHASES IN PROFESSIONAL ASSIGNMENT
R, D, and D Program Directors and Staff
R, D, and D Project Directors and Staff
Individual, R, D, and D Personnel
Stimulators and Co-ordinaters of R, D, and D Activities
R, D, and D Training Program Directors and Staff
Conducting Basic Scientific Inquiry
Investigating Educationally Oriented Problems
Gathering Operational and Planning Data
Inventing Solutions to Operating Problems
Engineering Packages and Programs for Educational Use
Testing and Evaluating Solutions and Programs
Informing Target Systems About Solutions & Programs
Demonstrating the Effectiveness of Solutions & Programs
Training Target Systems in the Use of Solutions & Programs
Servicing and Nurturing Installed Solutions & Programs
RESEARCH
DEVELOPMENT
DIFFUSION
FUNCTIONAL EMPHASES IN THE PROCESS OF R, D, AND D

Figure 1.

A Logical Structure for Viewing Research, Development, and Diffusion Roles in Education

Discussion of the Logical Structure

Figure 1 represents the operational structure employed throughout the study to classify R, D, and D personnel. A detailed discussion of the three dimensions of Figure 1 will be presented in the next three sections of this chapter. However, initially, it might be useful to examine, without detailed definition, how the cube was and can be used. The first and simplest determination for a given individual personnel case was provided by the institution in which the formal role was assumed; thus, to use two hypothetical cases, one might have a professor at Indiana University, referred to here as Case A, and an Office of Education employee, termed Case B here. After entering the cube at this point, the cases are "caught" on the horizontal dimension by determining the primary functional emphasis in professional assignment. Let us say, for example, that Case A is a professor of educational psychology and Case B is a research coordinator in a U.S.O.E. funding program. Additionally, Case A is directing a current research project. Case A, then, is picked up as an "R, D, and D Project Director or Staff," and Case B as a "Stimulator or Coordinator of R, D, and D Activities." The third placement, on the vertical dimension, is based upon the individual's emphasis in "Research," "Development," or "Diffusion." Case A would typically be found in vertical column 2--investigating educationally oriented problems. Until the recent programs directed toward development and diffusion were initiated by U.S.O.E., this would also have been the typical placement for Case B. One could easily imagine Case B, however, as falling in column 5 if the program emphasis were course content improvement; or in column 7 if the coordinator were working with the Educational Research Information Center, et cetera. The broken vertical lines are indicated on Figure 1 to show that it is not unusual for an individual to bridge more than one column. For example, if the Case B research coordinator were working on a course content improvement program, it would be very likely that his emphasis would bridge columns 4-6. It is unlikely to find an individual bridging more than one major functional emphasis, that is, research, development, or diffusion.

Obviously, the category headings designated in Figure 1 were not invented *de novo*. The categories under institutional settings and functional emphases in professional assignment were formed after attempting to sort hundreds of *National Register* questionnaires. An additional breakdown of these two dimensions into the sub-categories utilized in the study is presented in Figure 2. These sub-categories met the empirical test of sufficiency in terms of classifying the *National Register* questionnaires. The categories employed for the functional emphases in the process of R, D, and D were based on a logical structure employed by one of the authors in earlier work in this area. The detailed rationale for this particular schema is presented in detail in a separate paper.[2]

The reader should be alert to the varying precision possible in the placement of cases on the three dimensions. Almost complete accuracy can be claimed for placement on the institutional setting dimension. Reasonable accuracy is possible for most cases on the second dimension but an element of confusion is introduced as a primary emphasis must be determined. For example, a coordinator of research may also be spending a third of his time directing a research project. Placement on the third dimension depends much more on the judgment of the classifier for, as was noted earlier, the individual is likely to bridge categories. These imprecisions in placement are made sharper by the baseline data on which the projections are based. Since the project researchers were relying on secondary data, the original question asked of the respondent often did not emphasize placement on the second and third dimensions. This was evident in the National Register data, for example, where a project director might or might not have specified this aspect of his professional assignment.

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[2] Clark, David L., and Guba, Egon G., "An Examination of Potential Change Roles in Education," in Rational Planning in Curriculum and Instruction, National Education Association, Center for the Study of Instruction, Washington, D.C., 1967, pp. 111-133.

DIMENSIONS		
Institutional Settings for Personnel	Functional Emphases in Professional Assignment	Functional Emphases in the Process of R, D, and D
A. Colleges and Universities 1. Schools and Colleges of Education 2. Schools and Departments of Psychology 3. Other Behavioral and Social Science Schools and Departments 4. Other Discipline and Academic Areas 5. College and University Administration Units	A. R, D, and D Program Directors and Staff 1. Outside-funded R, D, and D Programs 2. R, D, and D Bureaus or Institutes 3. Institutional R, D, and D Programs	A. Research 1. Conducting Basic Scientific Inquiry 2. Investigating Educationally Oriented Problems 3. Gathering Operational and Planning Data
B. Federal Agencies 1. United States Office of Education 2. Military Agencies 3. Other Federal Agencies	B. R, D, and D Project Directors and Staff	B. Development 1. Inventing Solutions to Operating Problems 2. Engineering Packages and Programs for Educational Use 3. Testing and Evaluating Solutions and Programs
C. State Agencies 1. State Departments of Education 2. Other State Agencies	C. Individual R, D, and D Personnel 1. Hard-core R, D, and D Producers 2. Regular R, D, and D Producers 3. Occasional R, D, and D Producers	C. Diffusion 1. Informing Target Systems about Solutions and Programs 2. Demonstrating the Effectiveness of Solutions and Programs 3. Training Target Systems in the Use of Solutions and Programs 4. Servicing and Nurturing Installed Solutions and Programs
D. Schools and School Systems 1. Local Public Elementary and Secondary School Systems 2. Other Schools and School Systems	D. Stimulators and Coordinators of R, D, and D Activities	
E. Private Research Institutions and Agencies 1. Private Research Institutes 2. Private Social Service and Welfare Agencies	E. R, D, and D Training Program Directors and Staff	
F. Professional Associations 1. Professional Education Associations 2. Related Professional, Public, and Lay Associations		
G. Inter-Agency Organizations 1. Educational Laboratories 2. Other Inter-Agency Organizations		
H. Private Foundations		
I. Business and Industrial Organizations		

Figure 2. A Sub-Categorization of the Major Divisions and Categories of the Logical Structure for Viewing R, D, and D Roles in Education

For these reasons, the structure was used as a guide for a project data analysis system. An effort was made, where applicable and appropriate, to employ all the major dimensions of the cube to the various bodies of data with which the researchers worked. No attempt was made, however, to interrelate all the possible dimensions of the cube. Instead, major interrelationships were identified and pursued in analysis. For example, colleges and universities, particularly in schools and colleges of education, appear to be building up a substantial demand for research administrators--stimulators and coordinators of R, D, and D activities. This emphasis will be noted, and other emphases in their work in relation to the process of R, D, and D will be noted; but no effort will be made to project this need in specific categories on the third dimension.

The cube was used to help systematize the research efforts of the project staff. No particular brief is held by the researchers for any element in the structure. An attempt will be made to present the data in such a way that the reader can re-group it, if he wishes, into categories more comfortable for him. This structure and the definitions which follow are designed to clarify the terms used in data presentation. They are not designed, for example, to sell a "bill of goods" on the comprehensiveness or lack of comprehensiveness of the Title IV training program. If the reader is inclined to the position that the program should be servicing only vertical columns 1, 2, and 3, he may break out these figures and use them for his own purposes.

In summary, the cube or logical structure is simply a classification system for R, D, and D personnel. Institutional setting is a significant and useful dimension because personnel shortages are likely to emerge on an institutional basis, e.g., ESEA support is geared to institutional distribution of funds. Emphasis in professional assignment allows one to distinguish among the formal job assignments in an institution. For example, recent U.S.O.E. actions and policies have tended toward program rather than project support. This implies a long range commitment affecting both individual career patterns and staffing requirements within institutions. The functional emphasis in R, D, and D is simply an effort to encompass a range of functions sufficiently inclusive to be responsive to the various titles of ESEA and the demands that are likely to emerge in education over the next decade.

Institutional Settings for Personnel

Little amplification of this dimension of the structure is required. The final institutional settings selected for inclusion were derived chiefly from the National Register. Every setting was excerpted which met two criteria: (1) the setting appeared to be distinctive in the demands and expectations it made upon research, demonstration, and diffusion personnel or the type of product produced by such personnel; and (2) the potential number of persons to be found in the setting was of sufficient size (15-20 persons) to warrant its being included. A few settings were added which did not appear in the National Register data because these data were accumulated pre-ESEA, and certain settings, for example, Educational Laboratories, would not have appeared in the Register but would emerge in later sub-studies to be conducted as a part of this project.[3]

The following comments on each major heading under institutional and agency settings should suffice to define this dimension (Figure 2).

Colleges and universities. The bulk of the personnel engaged currently in educational R, D, and D were found in schools and colleges of education or schools and departments of psychology. Other behavioral and social science departments were grouped together because of the small numbers in any given department. The heading, "Other Discipline and Academic Areas," was populated chiefly by substantive specialists working on NSF course content improvement projects, or persons in other departments or professional schools, e.g., medicine, with a concern for certain aspects of behavioral research. Personnel engaged in institutional research were classified under "College and University Administration Units." This category also includes psychological personnel working in student personnel administration units, e.g., counseling centers and admissions offices. Also included were administrators whose research has nothing to do with their administrative role but who desire to maintain some meaningful contact with their discipline or subject area.

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[3] A brief explanation is probably in order at this stage about the nature of the National Register data, since it was critical in determining the dimensions of the logical structure. The Register project was an effort to establish the population of educational researchers in this country. By searching professional directories and journals the researchers identified every name they could find which was in any way associated with R, D, and D in education. Eventually 12,000 questionnaires were mailed and 55 percent were returned. Since the object of the search was the development of a national register of educational researchers, the opinion of the individual that he was, in fact, a member of the educational research community sufficed to qualify him for inclusion.

At the classification stage of this current study, no criteria were added. The staff worked with approximately 5,000 of the National Register questionnaires to attempt to categorize the individuals. At a later stage in data analysis, additional criteria were employed, e.g., percent of time spent on research, to describe the nature of the research community.

Federal agencies. Most of the personnel in this category from the National Register data were covered by the "United States Office of Education" heading. This includes administrators of research programs and substantive and statistical specialists engaged in normative studies. Military agencies were held out as a separate category because of the long-standing interest in training research manifested in this setting, although few individuals were identified as falling in this category. "Other Federal Agencies" includes personnel from the staffs of the National Science Foundation, National Institute of Mental Health, Office of Economic

Opportunity, etc., and a number of clinical and educational psychologists employed in such federal agencies as Veteran's Administration hospitals.

State agencies. The sub-heads employed here are quite obvious. The bulk of the researchers were found in the state departments of education. Another fairly large number of educational psychologists were found in state-sponsored child guidance clinics, hospitals, schools for the retarded, etc.

Schools and school systems. Most of the personnel found in this category were in research offices in public school systems. A number of classroom teachers identified themselves as occasional researchers. The second sub-head includes private and parochial schools as well as county and intermediate units.

Private research institutions and agencies. Included in this category were personnel in such agencies as American Institutes for Research, Science Research Associates, Systems Development Corporation, etc. "Private Social Service and Welfare Agencies" employed a number of educational and clinical psychologists who claimed identity with the educational research community.

Professional associations. The primary subhead "Professional Education Associations" included executive and staff personnel in such agencies as the National Education Association, American Educational Research Association, and the like. Professional associations, such as the American Psychological Association, and lay associations, e.g., National Congress of Parents and Teachers, are included under the heading, "Related

Professional, Public, and Lay Associations."

Inter-agency organizations. This heterogeneous grouping included institutions without legal sanction or responsibility which act as potential change agents in education by bringing some order of professional pressure to bear on the legally constituted agencies. Included were well-established agencies such as accrediting associations and school study councils as well as new institutional forms created by recent federal interest in education--the regional and national educational laboratories.

Private foundations. Included here are the central staff of such agencies, including the few (e.g., Russell Sage Foundation) that operate in-house research projects.

Business and industrial organizations. There were relatively few respondents in this category from the National Register data. However, this setting is rising in significance as new development agencies are formed by the publisher-hardware alliances.

Functional Emphases in Professional Assignment

An examination of the autobiographical data of the National Register questionnaires made it evident that within and across agency settings there were research, development, and diffusion personnel with similar professional assignments whose job differed significantly from that of other groupings of personnel. For example, there is a group whose raison d'etre is research stimulation or coordination. In colleges such persons may hold the position of assistant dean for research, while in the Office of Education they may be labeled research coordinators. In both cases, however, they differ significantly in job assignment from those spending full time administering a research and development program, those directing or working on an R, D, and D project, or those holding down a teaching or clinical assignment while participating in R, D, and D activities. This distinction seemed important to maintain for manpower projection purposes, since it is reflected in the nature of support programs.

R, D, and D program directors and staff. The personnel included in this category are research, development, and diffusion specialists who spend a majority of their time on *continuing* research and development programs, e.g., staff of private research agencies (ETS, AIR, etc.); members of research divisions in state education agencies, USOE, and the like; staff of educational laboratories, or R and D centers, or research training programs; and members of bureaus or centers or institutes regularly supported within institutions of higher education. Time and budget are the distinguishing features between the program personnel and those in the next category, designated as project staff. R, D, and D projects are typically funded on an extra-institutional basis with a specified starting and ending date. R, D, and D programs are typically funded within the on-going budget of an institution. Recent federal support for university-based R and D centers has changed this emphasis somewhat, but even in these instances the local institution must plan, as a part of the initial contract, to carry on the functions of the program after, or in the event that, federal funds are reduced or withdrawn.

The impact of this distinction on long-range personnel planning in education may be substantial. New career lines and careers are established through programs, not projects. Whereas projects cause little inter-institutional mobility except among inexperienced personnel (an established professor does not sign on for a year), programs cause wholesale raids from one agency to another. R and D centers and regional or national laboratories have a life of their own which demands a continuing manpower resource of their own.

The subheads in this category are used to distinguish among:

1. General R, D, and D enterprises stimulated by outside funds, e.g., R and D centers, Educational Research Information Centers, which are designated as "Outside-funded R, D, and D Programs"

2. Intra-institutional organizations designed to foster the R, D, and D objectives of the entire institution, e.g., research and service bureaus in schools of education, which are designated as "R, D, and D Bureaus or Institutes"

3. Units established by the institution to assess its own effectiveness and efficiency, e.g., bureaus of institutional research in colleges and universities, which are designated as "Institutional R, D, and D Programs."

R, D, and D project directors and staff. From the foregoing description of program staff, the project staff category is almost self-defining. This is a mobile population of R, D, and D personnel whose permanent career line places them elsewhere, but who for a defined period are engaged on a project for the major portion of their working hours. The typical project director or staff member in pre-ESEA days was the professor of education or educational psychology who was working on a government grant or contract project. With the advent of ESEA Title III there was a marked influx of public school personnel assigned to this category.

Individual R, D, and D personnel. Included in this category are staff members who participate actively, but on less than a full-time basis, in research, development, and diffusion functions. Typically, these personnel have multiple responsibilities attached to their jobs (e.g., teaching, counseling, research, clinical practice, administration, consulting), and perform two or more of these functions simultaneously. For example, in an institution of higher education the individual may be a part-time department head, teach one course, and devote one to two days a week to his own research project. Or, in a Veterans Administration hospital he may be assigned to clinical practice three days a week and have one to two days available to pursue his research interests. Whatever the mix, the individual searches for some balance in his role which, for purposes of inclusion in this study, must involve at least 20 percent of his time devoted to research, development, or diffusion activities.

The subheads used to distinguish personnel in this category are rough percentage breakdowns of the time spent on research, development, or diffusion. The "hard-core R, D, and D producer" spends the major portion of his professional life (two thirds or more) on R, D, and D activities. He is an insistent and consistent producer and, for education, in the past at least, a rare bird. The "regular R, D, and D producer" spends from one third to two thirds of his time on these activities. There is a definite professional commitment to the field. The "occasional R, D, and D producer" spends at least a day a week (usually not more) on his research and produces publishable material from time to time. Most research and research-related personnel in education have occupied this latter category unless they were assigned to some type of institutional research or service bureau or institute.

Stimulators and coordinators of R, D, and D activities. In many agencies, one or more staff administrators or consultants are provided to stimulate or coordinate R, D, and D activities in the institution. In an institution of higher education such an individual may be assigned on a college basis, e.g., assistant dean for research, or on a university basis, e.g., director of a research foundation. The activities attached to such a position may range from assisting in proposal writing to assisting in project budget preparation, or in creating in-service experiences for staff in the areas of R, D, and D. Whatever the setting, individuals in this category are primarily facilitators provided to assist other staff personnel to fulfill the institution's commitment to R, D, and D.

Also included within this category are agents of funding programs, e.g., USOE coordinators or private foundation R, D, and D directors and staff, who attempt to stimulate and then to coordinate and monitor project or program activities among grantee institutions.

R, D, and D training program directors and staff. Prior to the advent of ESEA it was almost impossible to identify personnel in education whose primary professional emphasis was on training R, D, and D personnel. The sporadic training which occurred was chiefly of an apprenticeship type on R, D, and D projects or programs supplemented by courses in methodology which were a part of the regular institutional doctoral program. Support for training under Title IV of ESEA altered this picture somewhat. There are now identifiable coordinators or administrators of R, D, and

D training programs; and there are short-term projects manned by staffs who, during this period, can be characterized as trainers.

Functional Emphases in the Process of R, D, and D

This dimension of functional job emphasis was included for three reasons. First, it reflects a changing emphasis in support for research in education which now includes development and diffusion programs designed to effect change in education. Second, it "catches" emerging new roles required to support these D and D programs. Third, it appeared from the National Register data to classify groups of research-related personnel whose work activity was distinct but who would not be separated from their colleagues by the foregoing two classificatory schemes.

Following are the operational definitions of the ten sub-categories of this dimension:

Research: Conducting basic scientific inquiry. The objective of this activity is to add to what is known in the social and behavioral sciences. The investigator may or may not see the content of his inquiry as relevant to the field of education, but the results of inquiry such as this form the knowledge base on which educational research and development is built. Though the concern of the investigator is not to solve an educational problem, the result of his effort may be to further understanding of an educational phenomenon.

At one extreme of this category is found the social or behavioral scientist whose contribution to educational research is clear (e.g., the verbal conditioning studies of the experimental psychologists) but to whom the content of education was irrelevant to the conduct of his investigation. Closer to the center of the continum would be the conventional educational psychologist or sociologist who identifies education as a continuing field of study but whose concern is adding to what is known about the processes of education. At the other end of the category is the educationist to whom content is directly relevant but who is tackling a basic conceptual problem which is impeding further inquiry in the area. The recent work of educational researchers on the change process in education illustrates this position. Despite the applied nature of the content, their concern is an explanation of the process of change in education.

Research: Investigating educationally oriented problems. This activity is also directed toward adding generalizable knowledge to the field of education, but the research problem is defined in operational terms; that is, the problem to be investigated is drawn from the operating context of education as a social process. Thus, the researcher studying the application of compressed speech techniques to the education of the blind and the researcher studying the utility of selection techniques for school administrators share a common concern in adding new knowledge about a problem confronting educators in the conduct of their daily business. To carry this distinction through in one content area, a study of the behavior of creative adolescents would fall in the category of conducting basic inquiry, but a study directed toward developing tests to measure creativity would be classified in this category. While there is a blurring between these categories in specific instances, in general the distinction can be maintained comfortably and meaningfully.

Research: Conducting social bookkeeping. This is not an attempt to isolate the normative survey technique in a special category. Obviously, the normative researcher could fall in either of the two foregoing categories. This is, instead, the appropriation of a term Paul Lazarsfeld and Sam Sieber used to describe those researchers in education whose purpose is to gather systematic and continuous social data on individuals or events in the field of education.[4] The U. S. Office of Education and the various state education agencies have long maintained statistics divisions for the purpose of gathering, analyzing, and publishing census-type data on students, teachers, educational expenditures, etc. This same type of activity can be found in the National Education Association, state education associations, and local school districts and institutions of higher education. The distinguishing characteristic of this type of inquiry seems to be its purpose. Instead of attempting to add new knowledge about education, the purpose is to provide planning data for use by educators and others in developing policies and programs.

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[4] Lazarsfeld, Paul F., and Sieber, Sam D., Organizing Educational Research, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1964, p. 5.

Development: Inventing solutions to operating problems. This phase of development has as its objective the solution of an operating problem within a system, or the solution of a set of operating problems which would be applicable on an inter-system basis. This activity can be distinguished from the category, "Investigating Educationally Oriented Problems," with which it is often grouped under the appellation "applied research." Where the researcher attempts to develop new knowledge about the operating problem, the inventor attempts to create a solution to the problem. If the creativity example can be carried one step further, the concern of the inventor is the discovery of educational techniques for the differential treatment of creative students which will optimize their learning. The researchers, in the example, were interested in distinguishing the behavior of creative adolescents from that of the general population of adolescents and quantifying these measures so that individuals in the "creative adolescent" category could be distinguished systematically. This leaves open the operational question of modifying practice, so that the distinction achieved results in altered behavior on the part of creative adolescents. Henry M. Brickell, in his monograph Organizing New York State Schools *for Educational Change*, attempted to distinguish invention from investigation (or research) by characterizing the appropriate environment for each. He noted, for example, that the very controls sought by the researcher to establish internal and external validity are anathema to the stimulation of invention where freedom to fail and change in a rich environment is required.[5]

Development: Engineering packages and programs for educational use. The textbook companies and test publishers have long played this engineering role in American education. More recently, the Course Content Improvement Studies section of the National Science Foundation has supported vast engineering projects such as SMSG, BSCS, PSSC, CHEM, *et cetera*. At a more modest scale, a group of social studies teachers employed by a school system for a summer to "package" an appropriate tenth grade world history course are engaged in the same process. The object of the game in each case is to bring together accumulated research and inventions into an organized form which can be used in an operating program.

Development: Testing and evaluating solutions and programs. The single term "evaluation" is commonly used to characterize the activity in this category. The evaluator has as his concern the development and application of criterion measures which can be used to assess the efficacy of proposed solutions and programs. The evaluation can be conducted initially in either a laboratory or a field setting but eventually must take the form of a field test, that is, an assessment of the solution under naturalistic conditions. A recent national effort of this sort was mounted, for example, to measure the effects of the PSSC materials. On an intra-system basis this activity might be characterized by a quality control or operations research program or, more simply, by a direct assessment of a world history course developed by teachers. Often, too often in educational research, this activity has been confused with research because the techniques required to do the job are research-like techniques. But the end product is quite different. The evaluator does not proceed to address himself to a research problem in the hope of building new knowledge about education. He has a specific task no matter how complex the task may be in any given situation. He is assessing the effects of a solution or program--nothing more. The ESEA has turned national attention among educators to evaluation by requiring evaluation of Title I projects. This is a clear and sharp example of the activity in this category.

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[5] Brickell, Henry M., *Organizing New York State Schools for Educational Change*, New York State Education Department, Albany, 1961.

Diffusion: Informing target systems about solutions and programs. In the literature of diffusion and innovation, this activity is often called dissemination. The objective is to inform target systems about the existence of an innovation. In education, professional journals, meetings and conventions, graduate courses, workshops for teachers, state supervisors in subject areas, etc., have all been applied, with varying effectiveness, toward the accomplishment of this purpose. Storage and retrieval systems such as USOE's Educational Research Information Center are modern information systems designed primarily to fill this need.

Diffusion: Demonstrating the effectiveness of solutions and programs. Educators have often confused the functions of informing and demonstrating, but they have quite different purposes. The objective of demonstration is "to convince." Demonstrations are conducted to exhibit the effectiveness of a particular solution or program. The traditional effort of this sort in education is the so-called "demonstration school" usually established and maintained in connection with a college or school of education. More recently Title III of ESEA has provided funds to set up demonstration or exemplary programs in public school systems. National organizations have for many years employed demonstration exhibits for this purpose. On an intra-system basis, curriculum specialists have often used demonstration classes or schools to introduce an innovation in the system. New approaches to the teaching of mathematics were "demonstrated" in recent years by teacher-advocates who undertook to teach demonstration lessons for teachers and administrators. In its fullest sense, a demonstration allows for interaction between the demonstration and the professional person, so that the end result of the demonstration is an evidential assessment of the solution or program by the target system.

Diffusion: Training target systems in the use of solutions and programs. In its grossest sense, this is simply the inservice education of professionals. However, the process as a step in diffusion is better exemplified by the recent effort of the National Science Foundation to support the programs being developed through their Course Content Improvement program with summer training programs for teachers who would be using the materials in their classrooms. On an intra-system basis this activity often takes the form of preschool workshops for teachers when a new content or methodology is being introduced in the system. However it occurs, the objective is simply to train the professional to handle the innovation efficiently and effectively. For the purposes of this classification system, general inservice education programs will not be included, but programs devised to support specific innovations will be included.

Diffusion: Servicing and nurturing installed solutions and programs. Many innovations require attention after being "adopted" by target systems. The Midwest Program in Airborne Television Instruction offered a recent clear example of this activity. Technical problems and adjustments arose almost from the day a school system decided to use this innovation. Eventually, MPATI was forced to maintain a network of field representatives to work with school systems, using the program to service the unique problems which arose in each system. Intra-system agents are often used to carry out this activity. A supervisor or consultant will become sufficiently well versed on an innovation to offer technical support when the operator or teacher requires it. The purpose of the activity is to provide the support needed to sustain the innovation in the system after it has been adopted. For purposes of this classification system, general support activities will be excluded (that is, the general support which an administrator provides his staff on a continuing basis), but specific support set up to sustain an innovation will be included, e.g., the MPATI field representative.

Summary

The first work task in the project was the construction of a logical structure to account for the formally defined institutional roles of R, D, and D personnel. This structure was built around:

1. The institutional setting in which the job is performed
2. The job title or functional emphasis of the job in terms of organizational assignment
3. The relation to R, D, and D or the functional emphasis of the job in terms of research and research-related processes, i.e., research, development, and diffusion.

This structure was employed initially to draw a picture of the research community as it existed in the United States in 1964, using empirical data which had been gathered in a number of recent research studies on educational researchers. The structure was employed subsequently to project demand for such personnel in the future based on empirical data gathered for that purpose. The essence of the structure is detailed in Figures 1 and 2 of this chapter.

CHAPTER II

A PICTURE OF THE EDUCATIONAL RESEARCH COMMUNITY IN 1964

The data reported in this chapter draw heavily upon three empirical studies of researchers in education which were completed on or near the baseline date selected initially for projection--July 1, 1964.[1] The authors of the *National Register* study cited in Chapter I offered the use of their original questionnaires, and these data were re-analyzed using the logical structure of this investigation to provide a description of the population of research personnel in education in 1964.[2]

An Overview of the Educational Research Community

At the beginning of the decade of the 1960's, two prominent educational researchers attempted to typify the world in which they were living. Griffiths in 1959[3] and Fattu in 1960[4] found marked quantitative and qualitative deficiencies in educational research. They noted that the number of personnel involved in the enterprise was small and that the work produced seemed not only to have little impact on the behavior of professionals in the field but also to be adding little to education's knowledge base. One of the current authors noted that:

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[1] Sieber, Sam D., *The Organization of Educational Research*, Cooperative Research Project no. 1974, Bureau of Applied Social Research, Columbia University, New York City, 1966, 364 pp.; Bargar, Robert; Guba, Egon; and Okorodudu, Corahann, *Development of a National Register of Educational Researchers*, Cooperative Research Project no. E-014, The Ohio State University Research Foundation, Columbus, Ohio, 1965, 139 pp.; Buswell, Guy T.; McConnell, T. R.; Heiss, Ann M.; and Knoell, Dorothy M., *Training for Educational Research*, Cooperative Research Project no. 51074, Center for The Study of Higher Education, University of California, Berkeley, California, 1966, 150 pp.

[2] A copy of the questionnaire from the *National Register* study is included as Appendix A.

> The vital point to be established is that educational research, at this point in its historical development, was clearly inhabiting the periphery of the profession. It could literally have ceased functioning overnight without causing a ripple in the educational scene.[5]

These essentially impressionistic reports were validated substantially by the Buswell and Sieber investigations of the early 1960's. The Buswell survey of education doctorates in 1954 and 1964 typified educational research as a field "still composed mainly of fragmentary, small scale investigations at a time when research on human behavior is no longer produced mainly by individual scholars but is increasingly the product of collaboration."[6]

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[3] Griffiths, Daniel E., Research in Educational Administration: An Appraisal and a Plan, Bureau of Publications, Teachers College, Columbia University, New York City, 1959, 59 pp.

[4] Fattu, Nicholas A., "The Role of Research in Education--Present and Future," Review of Educational Research, vol. 30, no. 5, December, 1960, pp. 409-421.

[5] Clark, David L., "Educational Research: A National Perspective," in Educational Research: New Perspectives, edited by Jack A. Culbertson and Stephen P. Hencley, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1963, pp. 33-42.

The Buswell sample of 818 education doctorates from the class of 1954 dribbled away startingly when the staff researchers attempted to identify research production on the part of the respondents after the receipt of the doctorate. Nearly one third stated they had had no research publications in the first 10 years following the doctorate. Another 40 percent were able to list no research publications, or they included publications which could not be classified by the staff as research. Approximately one hundred respondents pointed to a single research publication and another hundred could list two or more.[7] The group as a whole produced an average of 0.6 studies per person for the 10-year period following the doctorate.[8]

Concurrently, Sieber, surveying research units in schools and colleges of education, noted that such units "remain marginal to their institutions."[9] He attributed this to "the low priority of research in schools of education (as compared with service work or with advancement in the teaching hierarchy) and the conditions and ideologies which have promoted individualistic research."[10] In assessing prospects for the immediate future he noted that:

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[6] Buswell, Guy T.; McConnel, T. R.; Heiss, Ann M.; and Knoell, Dorothy M., *Training for Educational Research*, Cooperative Research Project no. 51074, Center for The Study of Higher Education, University of California, Berkeley, California, 1966, p. 1.

[7] *Ibid*., p. 9.

[8] *Ibid*., p. 13.

[9] Sieber, *op*. *cit*., p. 342.

> Lacking a tradition of research, many schools of education are unable to instill research orientation into graduate students or to provide the requisite internship experiences on faculty projects.[11] And what is equally important, these schools have failed to attract students who have the basic aptitudes for becoming excellent researchers or whose interests have not already been committed elsewhere. Finally, due to the emphasis on professional training through course work in a variety of specialities, training for research careers assumes minor importance in most schools, and serious programs for research training are a rare exception.[12]

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[10] *Ibid.*,

[11] The constancy of this problem in schools of education was verified by Buswell, *et al.*, (p. 53) when contrasting the 1964 and 1954 doctoral groups. Despite sharp increases in federal support for research in education during the decade, they found "the number of research assistants to a professor or in a bureau changed by less than 1.0 percent. The number who published research prior to receiving the doctor's degree decreased by 1.8 percent. The net change in amount of continuous full-time residence was close to zero," and he concluded that, "unless some new post-doctoral factors are introduced promptly there is little reason to expect any different record of research production from the 1964 group than for the 1954 group except for the important addition of greatly augmented research funds. But the training background of those who will use these resources is more like than different from that of the 1954 doctors."

[12] Sieber, *op. cit.*, p. 348.

The Buswell, Sieber, and Bargar studies confirmed mutually two other characteristics of the educational research community in 1964:

1. There were relatively few university centers of research production and training in education.

2. The bulk of active research personnel in education were prepared with academic backgrounds in psychology or educational psychology.

On the first point, Buswell reported that "60 percent of the persons in the research group came from 10 universities."[13] Bargar found only 12 universities that had produced five or more researchers per year in the decade 1952-1961;[14] and Sieber identified 15 institutions mentioned more than once by deans and research coordinators in schools of education when they were asked to name the graduate schools of education doing the best research.[15]

On the second point, 43.5 percent of the Bargar analysis group reported degrees in psychology (including educational psychology);[16] Sieber, in analyzing projects submitted to the Cooperative Research Program of the U. S. Office of Education, reported that 27 percent had backgrounds in psychology and only 2 percent had them in all other social science fields,[17] and that just over half of the "productive scholars" identified in the Buswell study reported psychology as their field of study at the doctoral level.[18]

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[13] Buswell, et al., op. cit., p. 37.

[14] Bargar, Robert; Guba, Egon; and Okorodudu, Corahann, Development of a National Register of Educational Researchers, The Ohio State University Research Foundation, Columbus, Ohio, pp. 95 ff.

[15] Sieber, op. cit., Appendix C, p. 2.

[16] Bargar, et al., op. cit., p. 67.

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The Buswell data also supported the fact that the research effort in education was located primarily in the college and university setting. Among Buswell's 100 multiple research producers, over 80 percent held positions in institutions of higher education at the time of his survey.[19] Since the criteria of publication used by Buswell favored the identification of the R and D producer in the college and university, the number in that setting was inflated. However, there is little doubt that this was the predominant setting for the researcher in 1964.

Summary

Empirical studies of the educational research community in 1964 indicated that:

1. Research in education had not been institutionalized--it was an individualistic pursuit.

2. The investigations were fragmentary and small scale efforts.

3. The educational researcher was a part-time functionary.

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[17] Sieber, op. cit., Appendix A, p. 36.

[18] Buswell, et al., op. cit., p. 76.

[19] Ibid.

4. Most educationists were not involved directly in the research field--their productivity as researchers was miniscule.

5. Change was slow to come to the field--despite increases in federal funds little difference could be observed from 1954 to 1964.

6. Research was not central to the operation of most schools of education and, inferentially, to the operation of elementary and secondary schools.

7. The input of new researchers to the field of education was small--probably not more than one of ten doctoral graduates.

8. The field was inhabited chiefly by researchers with a background in psychology or educational psychology.

9. Most of the research effort was university-based.

10. The research effort was centered for the most part in 10-20 universities offering the doctorate in education.

Source Data Supporting a Quantitative Estimate of Educational Research Personnel

No single body of empirical data available to, or collected by, the staff of this project yeilded a clear picture of the number of persons who might have been classified as R, D, and D personnel in education in 1964. Consequently, the staff engaged in comparison, examination, and re-analysis of the extant data, within the framework of this study's logical structure, in an effort to define and refine the number of persons within each personnel group to the point where this number could be used with assurance for the purpose of personnel projections. Before attempting actual estimations of R, D, and D personnel by categories, this section will examine and discuss the Buswell and _National Register_ studies and attempt to establish certain minima below which the population of R, D, and D personnel in education in 1964 could not fall. The assumption being used at this point is that the primary problem in estimating R, D, and D personnel in education in 1964 rests not in justifying the inclusion of a case identified, for example, by Buswell, but rather in determining the number of cases not picked up in the Buswell or _National Register_ studies. This section, then, will:

1. Establish minimum estimates of R, D, and D personnel in education in 1964.
2. Validate these estimates, to whatever extent possible, across studies.
3. Set the stage for the final estimate which will be presented in the following section.

Re-examination of the Buswell Data

One quantitative view of the world of educational research was offered by Buswell, who traced his 818 doctors of the year 1954 to their professional positions in 1964.

The confidence which can be placed in these figures as absolute numbers of persons in various institutional settings is shaken by the fact that only 60 percent (818 of 1370) of the valid cases in the study returned the questionnaire and no analysis of non-respondents was reported. It seems reasonable to assume that non-respondents were less likely to be productive researchers than the responding group and that an indeterminate number of active researchers were excluded.

Among the Buswell respondents, 101 reported that they had published two or more research studies during the 10 year period following the doctorate. Ten years later they were employed in the following settings:

Category	Number	Percent
University professors of education	48	47.5
University administration and counseling	22	21.8
University professors outside education	11	10.9
Business, industry, other non-academic positions	12	11.9
Local, state, or federal education agencies	3	3.0
Unclassifiable	5	5.0
TOTAL	101	100.1

The implications of these data would seem to be clear. The research community in education in 1964 was found in the college and university. However, it should be pointed out that Buswell employed a restricted definition of R, D, and D which would have been expected to exclude many individuals engaged in institutional research or in development projects. Specifically, the criteria for research publication were as follows:

> "1. The research must have been published.
>
> 2. References in local publications dealing with matters of purely local concern were excluded.
>
> 3. In general, book references were excluded although, if a portion of the book contained a primary report of a research study, it was listed.
>
> 4. Reviews of research or of professional books were excluded.
>
> 5. Studies of a philosophical or logical nature were accepted if they were published in a reputable journal in that area."[20]

Another limitation of the Buswell data as a base for estimating the overall R, D, and D community is that it is probably accurate for only one institutional setting--schools and colleges of education. This is no criticism of the Buswell study, since it was never intended to serve as a base for manpower resource projections. However, the characteristics of the data would lead one to assume that:

1. Individuals outside the field of professional education in colleges and universities would be underrepresented, since most of the producing educational researchers in these non-education departments would not have had a primary degree in education.
2. Personnel in non-university settings affiliated with public education, i.e., local, state, or federal education agencies, would be underrepresented because of the criteria for research production used in the study.

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[20] Buswell, *et al.*, *op. cit.*, p. 9.

On the other hand, it can be reasonably assumed that school and college of education researchers were identified with some accuracy. The Buswell population is the population from which the producing researcher in schools and colleges of education would be drawn. Developers and diffusers would be underrepresented, but they constituted a miniscule percentage of the R, D, and D activity in schools of education in 1964, as will be demonstrated later in this study. Some unspecified number of individuals in schools of education did not respond to the Buswell questionnaire, and they will have to be ignored except to note that the percentage of respondents who were, in fact, producing researchers is probably a high percentage of the total group of producing researchers in schools of education. The producing and successful researcher was reinforced in his behavior by the nature of the questionnaire, and, for the most part, would have had a high level of interest in the content of the study. Exactly the reverse could be noted for the non-respondents.

In any event, the projection can be considered a minimum figure to be used for comparative purposes. The base figure, you will recall, is the 48 who became research-producing university professors of education. This represents 3.1 percent of the 1,495 doctoral graduates in education in 1954. At this point an assumption needs to be introduced, to wit:

The research productivity of the doctoral graduating class in education of 1954 is similar to that of other doctoral graduating classes in education in the first half of the decade of the 1950's.

There seems to be no particular reason to assume otherwise, and Buswell's conclusions on the similarity of the 1954 and 1964 classes adds credence to the assumption.

Operating from this assumption, one can infer that approximately the same percentage of doctorates in education who became producing university professors of education would have emerged from the 1951, 1952, 1953, and 1955 classes which had the following number of graduates:[21]

Class		Graduates
1951		1,109
1952		1,305
1953		1,416
1955		1,571
	TOTAL	5,401

If 3.1 percent, or 167, of this total is added to the 48 university professors of education in 1954, there would be a total of 215 for the five-year period. A second assumption must be made at this stage:

No artifact of the sample employed in the National Register study would affect the year-by-year conferral of the highest level degree within that sample and the more specialized sub-group identified by Buswell.

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[21] National Academy of Sciences, National Research Council, Doctorate Production in United States Universities 1920-1962, Publication no. 1142, Washington, D.C., 1963, p. 11.

Nothing in the data reported in the two investigations would suggest that this is an unreasonable assumption. The reason for the necessity of the assumption is that the National Register study reported educational history data for the respondents and noted that 25.1 percent of the total sample received their degrees during the five-year period 1951-1955.[22] One might assume, then, that the total obtained for the 1951-1955 period is roughly a quarter of the total minimum population, which would be 860.

This figure, combined with some data from the Sieber report, can be used to estimate the percentage of non-school of education researchers located in the university setting. The 410 Cooperative Research Program projects which Sieber classified as "Education," "Outside education, but in university and college," and "Outside university or college," were distributed as follows:[23]

	Number	Percent
Education	204	50.5
Outside education	163	40.3
Outside university	37	9.2
TOTAL	404	100.0

Among the university-based proposals, then, 204 of the 367 (or 55.6 percent) were in schools of education and 163 of the 367 (or 44.4 percent) were outside education. This might well be a reasonable estimate of the proportion of actual researchers in schools of education as contrasted with those in other university settings.

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[22] Bargar, et al., op. cit., p. 72.

[23] Sieber, op. cit., Appendix A, p. 25.

To use these data, the assumption must be made that:

> The distribution of proposals received by the Cooperative Research Program between 1956 and 1963, classified by the organizational location of the principal investigator within a college or university, reflects accurately the distribution of active researchers in education in institutions of higher education.

Operating under this assumption, the 860 producers in schools of education are 55.6 percent of the total of university-based researchers in education which is, then, approximately 1,545, leaving 685 as a minimum base for researchers in education located in colleges and universities but not in schools or colleges of education. This figure would probably not account for personnel in college and university administration units, but these would be unlikely to be represented in the Cooperative Research Program studies as a principal investigator, since they are either engaged in institutional research or are devoting very little time to research--less time than would typically be required of a principal investigator.

This minimum estimate of R, D, and D personnel in the college and university setting is as far as the Buswell data can be stretched since, as was noted earlier, this is the only setting for which these data are valid. In the next section, the National Register data will be re-examined in some detail, since these data represent the primary source used in the study.

Re-analysis of the National Register Data

In 1966, Phi Delta Kappa published a *National Register of Educational Researchers*[24] which was based on an earlier Cooperative Research Program project, *Development of a National Register of Educational Researchers*.[25] If the Buswell study was restrictive in its definitions, the *National Register* was permissive. Using a variety of identification sources,[26] some 12,000 questionnaires were distributed and, for the most part, all cases which responded were retained if they could in any way be identified with research in education. Again, it is difficult to deal with the question of non-respondents, since no non-respondent analysis was attempted, but it is clear that the *National Register* study failed to identify some number of individuals who might be classified as researchers in education. The least that can be said for these data, however, is that they would define a minimum base for the educational research community in the country in a wide variety of institutional settings if some criteria could be applied to cull out the obvious non-researchers who responded.

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[24] *National Register of Educational Researchers*, Phi Delta Kappa, Inc., Bloomington, Indiana, 1966, 253 pp.

[25] Bargar, *et al.*, *op. cit.*

[26] *Ibid.*, pp. 8-9.

In January, 1966, the National Register project staff turned over their questionnaires (about 5,000) to this project staff for re-analysis. A first step was taken by applying a criterion for inclusion in the sample as a researcher. Each respondent had been asked to indicate the percentage of time devoted to administration, teaching, and research. All respondents who did not indicate at least 20 percent of their time (one day per week) devoted to research were eliminated unless the respondent was a research administrator spending full time on the administration of research. The application of this single criterion reduced the total number included to 2,522.

The remainder of this section will be devoted to the initial analysis of these 2,522 questionnaires. The reader should recall that no claim is made that this represents the total population of R, D, and D personnel in any category. It obviously does not, since the National Register data include only respondents to their questionnaire. These figures are minima, used to characterize the educational R, D, and D community in 1964 and to serve as a base for the quantitative estimates which will be presented later in this chapter. These are source data, not the final estimates.

R, D, and D personnel in university settings. Predictably, the largest percentage of the respondents were located in college and university settings--1,736 of the 2,522, or 68.8 percent. Table 1 indicates the distribution of this sample across units within the university setting.

Useful comparisons can be drawn with the data discussed earlier in the chapter:

1. Again it appears that by far the highest percentage of R, D, and D personnel in 1964 did function in the university setting. The estimate of personnel in this setting will be crucial in establishing the total R, D, and D population.

2. The Buswell sample did, in fact, seem to under-represent non-college of education researchers in education. Forty-seven and one-half percent of that total sample were in the college of education category, and only 10.9 percent were in other schools and departments in universities. These data indicate an almost equal number in the two settings--34 percent in schools of education, 30.4 percent in other departments.

3. There is a substantial difference in the administrative category where Buswell had 21.8 percent of his total, and these data show only 4.4 percent of the total. This discrepancy can be explained. First, of course, the more thorough identification of personnel outside the university setting depresses the percent of the total in this category. Additionally, and more to the point, these data are directed at identifying current researchers, and Buswell sought producers over a 10-year period. Many of the administrators in the Buswell sample would be individuals who had produced

two or more research articles in their first 10 years past the doctorate but would not now claim to be spending 20 percent or more of their time on research. As a matter of fact, these two sub-samples are probably nearly mutually exclusive. The Buswell sample should be composed chiefly of deans, assistant deans, and associate deans in schools of education who are not currently spending 20 percent of their time on research. The administrators in the National Register study, in contrast, are primarily (two thirds) institutional researchers who tended, by definition, to be excluded from the Buswell study.

TABLE 1. NUMBER AND PERCENT OF EDUCATIONAL R, D, AND D PERSONNEL EMPLOYED IN UNIVERSITY SETTINGS--1964

Setting	Number	Percent within universities	Percent of total sample
Schools and Colleges of Education	857	49.4	34.0
Schools and Departments of Psychology	359	20.7	14.2
Other Behavioral and Social Science Schools and Departments	266	15.3	10.5
Other Discipline and Academic Areas	144	8.3	5.7
College and University Administration Units	110	6.3	4.4
TOTAL	1,736	100.0	68.8

R, D, and D personnel in other settings. Of the remaining 31.2 percent of the identified researchers, almost all (25.7 percent) are accounted for by four other major institutional settings--schools and school systems, federal agencies, state agencies, and private research institutes and agencies. The numbers in these institutions are presented in Table 2.

A description of the respondents in each category might be of use to the reader, since these categories will be retained and used through the rest of the report. The 220 reporting in the category "School Systems" were divided nearly 50/50 between (a) employees of divisions of research and (b) teaching, counseling, or administrative personnel who claimed they were working the equivalent of a day a week on research project activity.

TABLE 2. NUMBER AND PERCENT OF R, D, AND D PERSONNEL EMPLOYED IN SELECTED NON-UNIVERSITY SETTINGS--1964

Institutional setting	Number	Percent within setting	Percent of total sample
SCHOOLS AND SCHOOL SYSTEMS	220	100.0	8.7
Local Public School Systems	186	84.5	7.4
Other Schools and School Systems	34	15.5	1.3
FEDERAL AGENCIES	179	100.0	7.1
U. S. Office of Education	97	54.2	3.8
Military Agencies	32	17.9	1.3
Other Federal Agencies	50	27.9	2.0
STATE AGENCIES	124	100.0	4.9
State Departments of Education	74	59.7	2.9
Other State Agencies	50	40.3	2.0
PRIVATE RESEARCH INSTITUTES AND AGENCIES	124	100.0	4.9
Private Research Institutes	96	77.4	3.8
Private Social Service and Welfare Agencies	28	22.6	1.1
TOTAL	647	--	25.6

Most of the 179 "Federal Agencies" cases were found in the United States Office of Education and two thirds of them, reflecting the organization of USOE at the time of data collection, were filling "Specialist" roles, e.g., Specialist in Science Education, Specialist in Elementary Education, etc. Their research activity consisted primarily of non-repeating normative surveys and selective bibliographic and historical studies. Only nine cases were reported as filling research coordination or stimulation positions. Of the 50 cases included under "Other Federal Agencies," the majority were clinical or educational psychologists employed by federal social service or welfare agencies, e.g., veteran's hospitals. The military agency representatives were generally psychologists working on military training programs.

Within the "State Agencies" category, the 74 respondents in the state departments of education were located chiefly in research divisions. Other state agency personnel were psychologists working in both state and local social service and welfare agencies.

The only significantly large build-up of personnel in the "Private Research Institute and Agency" category were the 96 in private research institutes such as American Institutes for Research, Educational Testing Service, etc., who were predominately project directors or general staff administrators.

The remaining 139 cases (5.5 percent), not reported in Table 2, were spread among four categories--professional associations, inter-agency organizations, private foundations, and business and industrial organizations. The only build-up of personnel occurred in the research divisions of professional associations (42) and research units in business and industrial organizations (45).

Most significantly absent in these non-university institutional settings of pre-ESEA days were personnel in educational laboratories or Title III project centers.

Functional emphases in professional assignment. As would be expected from the descriptions of the educational research community presented earlier in this chapter, the bulk of personnel were classified by emphasis in professional assignment as "Individual R, D, and D Personnel," that is, part-time researchers who carry on a variety of other functions in teaching, counseling, administering, and the like. In fact, 1,556, or 61.7 percent of the total, fall in this category, as illustrated in Table 3.

TABLE 3. NUMBER AND PERCENT OF R, D, AND D PERSONNEL CLASSIFIED BY FUNCTIONAL EMPHASIS IN PROFESSIONAL ASSIGNMENT AS INDIVIDUAL R, D, AND D PERSONNEL--1964

Percent of time to research	Number	Percent in category	Percent of total sample
Hard-core Producers (2/3 or more)	152	9.8	6.0
Regular Producers (1/3-2/3)	474	30.5	18.8
Occasional Producers (1/5-1/3)	930	59.8	36.9
TOTAL	1,556	100.1	61.7

The predominant number (59.8 percent) spend such a small percentage of time on research that they must be classified as "Occasional Producers." These occasional producers and other multi-function personnel are found in all institutional settings, but the predominant number are located in colleges and universities, as shown in Table 4.

TABLE 4. NUMBER AND PERCENT OF R, D, AND D PERSONNEL CLASSIFIED AS INDIVIDUAL R, D, AND D PERSONNEL IN TEN SELECTED INSTITUTIONAL SETTINGS

Settings	Hard-core producers		Regular producers		Occasional producers	
	No.	Percent of total	No.	Percent of total	No.	Percent of total
Schools and Colleges of Education	42	27.6	187	39.5	440	47.3
Schools and Departments of Psychology	19	12.5	107	22.6	168	18.1
Other Behavioral and Social Science Departments	32	21.1	76	16.0	100	10.8
Other Discipline and Academic Areas	13	8.6	37	7.8	62	6.7
College and University Administration Units	-	0.0	5	1.1	35	3.8
U. S. Office of Education	21	13.8	31	6.5	16	1.7
Other Federal Agencies	13	8.6	6	1.3	13	1.4
State Education Departments	2	1.3	5	1.1	13	1.4
Other State Agencies	1	.7	5	1.1	22	2.4
Local Public Elementary and Secondary School Systems	1	.7	7	1.5	47	5.1
All Other	8	5.3	8	1.7	14	1.5
TOTAL	152	100.2	474	100.2	930	100.2

The environment for research in schools of education, which has received negative appraisal from so many observers, appears from the data in Table 4 to be less than ideal. No one would expect that higher education would maintain equivalent groups in each category in terms of absolute numbers. They are, after all, multi-function institutions. However, schools of education tail off sharply as the percent of time devoted to research is applied to their personnel, falling from nearly half the occasional producers to only a quarter of the hard-core producers. For the group as a whole, schools of education have only half as many (6.3 percent) of their individual researchers in the hard-core category as the other settings (12.8 percent).

Of the approximately 1,000 persons not included in Tables 3 and 4, most are found in the "R, D, and D Program Directors and Staff" category. Table 5 presents these 764 cases across agency settings. One artifact of the sample should be pointed out here. Many of those identified in Tables 3, 4, and 5 were project directors or staff who were not identified as such. The questionnaire did not specifically designate project activity as a response; consequently, the category "Project Directors and Staff" (with only 115 respondents) is clearly underrepresented. At the time the data were gathered, there were also few specially-designated research training programs and only two were identified as having a primary professional commitment in this field.

TABLE 5. NUMBER AND PERCENT OF R, D, AND D PERSONNEL CLASSIFIED AS R, D, AND D PROGRAM DIRECTORS AND STAFF IN 12 SELECTED INSTITUTIONAL SETTINGS

Settings	Outside-funded programs	Research and service bureaus		Institutional research	
		No.	Percent of total	No.	Percent of total
Schools and Colleges of Education	7	124	23.8	3	1.3
Schools and Departments of Psychology	1	48	9.2	1	.4
Other Behavioral and Social Science Departments	1	45	8.6	-	-
College and University Administration Units	-	2	.4	62	26.6
U. S. Office of Education	-	18	3.4	2	.9
Military Agencies	-	14	2.7	7	3.0
Other Federal Agencies	-	16	3.1	3	1.3
State Departments of Education	-	36	6.9	11	4.7
Schools and School Systems	-	3	.6	143	61.4
Private Research Institutes and Agencies	-	96	18.4	-	-
Professional Associations	-	51	9.8	1	.4
Inter-Agency Organizations	-	24	4.6	-	-
Business and Industrial Organizations	-	45	8.6	-	-
TOTAL	9	522	100.1	233	100.0

Among the respondents classified as "R, D, and D Program Directors and Staff," the largest group (143) were found in public school systems and were categorized as institutional researchers. These cases represented personnel in conventional research divisions in local school systems whose task was primarily to gather operational and planning data for the chief school administrator. A similar group of 62 institutional researchers were identified in college and university administration units.

The 124 persons located in school of education research and service bureaus were functioning in the well established agencies of this sort which have been studied intensively by Sieber.[27] No attempt was made to distinguish between the research and service emphases of those agencies in analyzing the data, but the questionnaire was designed to encourage responses from those engaged in research activities. The survey appeared to pick up a large percentage of R, D, and D personnel in these agencies when the figures are compared with the Sieber data--an exercise which will be followed up more thoroughly later in this chapter.

The 93 individuals located outside schools of education but in colleges and universities were employed in the conventional research bureaus found in the social and behavioral sciences. That their number compared favorably with those in the schools of education affirms the earlier distribution of educationist, non-educationist researchers noted in Table 4. As a matter of fact, the percentage in the three common categories is identical. There were 1,171 researchers identified as "Individual R, D, and D Personnel" in schools and colleges of education, schools and departments of psychology, and other behavioral and social science departments. Of these, 669, or 57.1 percent, were in schools of education. In this category, 217 were spread among the three settings and 124, or 57.1 percent, were in schools of education.

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[27] Sieber, op.cit., pp. 93-145.

The federal agency representatives were almost all social bookkeepers (e.g., the statistics staff of the United States Office of Education) except for the military agency personnel who were training program directors.

The state education agency personnel were, as would be expected, in divisions of research, but almost all those who responded were administrators in such agencies. This category was definitely underrepresented, since the United States Office of Education, in 1965, was able to identify nearly 300 ful-time-equivalent R, D, and D personnel employed by state education agencies in research or planning capacities.[28]

Almost by definition, the respondents from the private research institutes and agencies fell in this category. The problem was accentuated by the inability to distinguish between program and project directors and the propensity exhibited by these agencies to attach an administrative title to most of their employees.

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[28] Office of Education, Reinforcing the Role of States in Education, United States Department of Health, Education, and Welfare, United States Government Printing Office, Washington, D. C., March, 1967, Appendix C, p. 68.

Professional association representatives were employees of research divisions in such institutions, engaged chiefly in normative research. The inter-agency organization personnel were, again, classified in this category almost by definition. In this group, it was interesting to note that almost no responses were received from individuals working on course content improvement projects. Business and industrial organization respondents were quite similar to those noted earlier in the private research institute category, and again few development-type personnel returned the questionnaire.

Tables 6 and 7 summarize the limited data available on "Project Directors and Staff" and "Stimulators and Coordinators of R, D, and D Activities." Little can be noted in regard to Table 6 other than the fact that the distribution of personnel within and outside schools of education is consistent with previously reported data.

TABLE 6. NUMBER AND PERCENT OF R, D, AND D PERSONNEL CLASSIFIED AS PROJECT DIRECTORS AND STAFF WITHIN THE UNIVERSITY SETTING

Setting	Number	Percent of total
Schools and Colleges of Education	39	54.2
Schools and Departments of Psychology	14	19.4
Other Behavioral and Social Science Departments	11	15.3
Other Discipline and Academic Areas	7	9.7
College and University Administration Units	1	1.4
TOTAL	72	100.0

In Table 7, those reporting from schools of education were typically school coordinators of research or assistant or associate deans for research whose assignments were to stimulate research interest and activity in the unit. The unexpected number in other disciplines, professions, and cognate areas were, for the most part, psychologists employed by schools of medicine to evaluate curricular innovations in the school or to apply their expertise to the invention of new curricular practices. The college and university administrative personnel were either located in small colleges where their position was similar to that of a school of education coordinator of research, or were in university research foundations with some specially assigned responsibility for the professional education unit. The United States Office of Education, private foundations, and other federal agency categories were represented by personnel administering research funding programs.

TABLE 7. NUMBER AND PERCENT OF R, D, AND D PERSONNEL CLASSIFIED AS STIMULATORS AND COORDINATORS OF R, D, AND D ACTIVITIES

Settings	Number	Percent of total
Schools and Colleges of Education	15	24.2
Other Discipline and Academic Areas	10	16.1
College and University Administration Units	5	8.1
U. S. Office of Education	9	14.5
Military and other Federal Agencies	7	11.3
State Education Departments	4	6.5
Schools and School Systems	3	4.8
Private Foundations	3	4.8
Others	6	9.7
TOTAL	62	100.0

Functional emphases in the R, D, and D process. Three factors interacted to depress the identification of any significant number of personnel in categories other than that labeled "Research." First and foremost, there were simply few individuals involved in activities which could be labeled "Development" or "Diffusion." Secondly, the questionnaire made it difficult for such individuals to respond appropriately, since it was directed primarily toward more conventional research activity. Finally, many developers and diffusers were probably unwilling to respond to the questionnaire, feeling that they were not the population sought by the researchers.

In any event, a classification of a 20 percent sample of the population of respondents by the categories "Research," "Development," and "Diffusion" unearthed only a handful (4.4 percent) who could be categorized in other than the research category. Specifically the personnel were distributed as follows:

Category	Percent
Research	95.6
Development	3.2
Diffusion	1.2

Since the staff was dealing with such small numbers, no attempt was made to break this down by setting and emphasis in professional assignment, but it may be interesting to note where some of the clusters of developers and diffusers were found.

As might be expected, the business and industrial organization setting produced some engineers or packagers and some diffusers. However, many more were obviously employed in this category who did not feel that a response to the questionnaire was appropriate. Few of those in the private research institute setting appeared to be involved in development except for those in test development agencies who were clearly working on development problems and were carrying the process through field testing.

Most of the public school researchers appeared to be engaged in conventional data gathering activities directed toward the provision of operational and planning data for the local school administrator. No development or diffusion units were discovered at the local school level.

In colleges and universities there was occasional reference to a development or diffusion project. If conventional field service in a research and service bureau is classified as development, a few cases could be added to the category, e.g., conducting school surveys, providing *ad hoc* consultant service. An isolated individual or two reported involvement in information storage and retrieval. As was noted earlier, few responses were received from persons engaged in either USOE or NSF course content improvement activities.

One check was run on the extent to which the miniscule representation in the development and diffusion categories was an artifact of the questionnaire and search process in the 1964 data. Office of Education projects for fiscal year 1966 were analyzed to determine the percentage of personnel in each category called for by the projects. This was soon after passage of the ESEA but reflected the Office of Education emphasis on development and diffusion in the curriculum projects in English and social studies, early exploratory work with ERIC, and the development components of the special funding programs in adult and vocational education and education of handicapped children and youth. Most of the persons involved in these projects were in college and university settings at this date and the distribution of all persons working in Office of Education projects in July, 1966, in terms of functional emphasis in R, D, and D was:

Category	Percent
Research	65
Development	25
Diffusion	10

The data analyzed by the staff for July 1, 1964, appeared to underrepresent these categories, but the extent of underrepresentation is still uncertain. The extreme of underrepresentation comparing these data might be set at 10:1. This unlikely, however, since Office of Education projects would tend to be underrepresented in the research category and heavy pressure was being exerted in the Office of Education in FY '66 to initiate development-type projects.

The field was in transition and the transition was being stimulated by the very Office of Education projects which were analyzed. The reader should note carefully that this altered distribution from the analysis of Office of Education projects represented only projects initiated in FY '66 and is not representative of the project activity prior to that year.

Summary

The data presented in this section are summarized in Table 8. A summary characterization of the educational R, D, and D community in the United States in 1964 based on these data leads to the following observations:

1. The preponderance of R, D, and D personnel in 1964 were located in college and university settings, functioning as individual researchers on a part-time basis.

2. Most individual researchers reported devoting part-time to R, D, and D activity, and the modal time reported was very much part-time--one fifth to one third time.

3. Research personnel located in schools of education were most likely to be spending a small percentage of time on their research activity.

4. Within the college and university setting 50 percent to 60 percent of the R, D, and D personnel were affiliated organizationally with a school or college of education.

5. USOE research personnel in 1964 were either working as social bookkeepers or as specialists conducting discrete studies in substantive areas.

6. State department of education personnel were chiefly normative researchers employed in research divisions.

7. Schools and school systems were represented by some teachers, counselors, and administrators working for a small percentage of their time on R, D, and D projects, and by data gatherers functioning in a research division.

8. Few development and diffusion personnel seemed to be functioning in the R, D, and D community in 1964, and even fewer were identified through the questionnaire and search techniques employed in the study.

TABLE 8. SAMPLE OF R, D, AND D PERSONNEL BY AGENCY SETTING AND FUNCTIONAL JOB EMPHASIS--1964

Setting	R, D, D Program Dirs. and Staff				R, D, D project directors and staff	R, D, D training program directors and staff	Individual R, D, D Personnel				Stimulators and coordinators of R, D, and D activities	Total
	Outside-funded	Res. and service bureaus	Institutional research	Sub-total			Hard-core prod.	Reg. prod.	Occa. prod.	Sub-total		
COLLEGES AND UNIVERSITIES												
Schools and Colleges of Education	7	124	3	134	39	--	42	187	440	669	15	857
Schools and Depts. of Psychology	1	48	1	50	14	1	19	107	168	294	--	359
Other Behavioral and Social Science Depts.	1	45	-	46	11	--	32	76	100	208	1	266
Other Discipline and Academic Areas.	-	14	-	14	7	1	13	37	62	112	10	144
College and University Administration Units	-	2	62	64	1	--	--	5	35	40	5	110
Sub-total	9	233	66	308	72	2	106	412	805	1323	31	1736
FEDERAL AGENCIES												
U. S. Office of Education	-	18	2	20	--	--	21	31	16	68	9	97
Military Agencies	-	14	7	21	2	--	4	1	1	6	3	32
Other Federal Agencies	-	16	3	19	1	--	9	5	12	26	4	50
Sub-total	0	48	12	60	3	0	34	37	29	100	16	179
STATE AGENCIES												
State Departments of Education	-	36	11	47	3	--	2	5	13	20	4	74
Other State Agencies	-	8	-	8	12	--	1	5	22	28	2	50
Sub-total	0	44	11	55	15	0	3	10	35	48	6	124
SCHOOLS AND SCHOOL SYSTEMS												
Local Public School Systems	-	1	117	118	10	--	1	7	47	55	3	186
Other Schools and School Systems	-	2	26	28	--	--	--	--	6	6	--	34
Sub-total	0	3	143	146	10	0	1	7	53	61	3	220
PRIVATE RESEARCH INSTITUTES AND AGENCIES												
Private Research Institutes	-	87	-	87	2	--	2	2	1	5	2	96
Private Social Service and Welfare Agencies	-	9	-	9	1	--	4	6	7	17	1	28
Sub-total	0	96	0	96	3	0	6	8	8	22	3	124
PROFESSIONAL ASSOCIATIONS												
Professional Education Associations	-	42	-	42	4	--	--	--	--	--	--	46
Related Professional, Public, Lay Assoc.	-	9	1	10	1	--	--	--	--	--	--	11
Sub-total	0	51	1	52	5	0	0	0	0	0	0	57
INTER-AGENCY ORGANIZATIONS												
Educational Laboratories	-	-	-	-	--	--	--	--	--	--	--	0
Other Inter-Agency Organizations	-	24	-	24	4	--	--	--	--	--	--	28
Sub-total	0	24	0	24	4	0	0	0	0	0	0	28
PRIVATE FOUNDATIONS	-	1	-	1	1	--	2	--	--	2	3	7
BUSINESS AND INDUSTRIAL ORGANIZATIONS	-	45	-	45	2	--	0	--	--	0	0	47
TOTAL	9	545	233	787	115	2	152	474	930	1556	62	2522

However many might have been located by different techniques, it does seem clear that development and diffusion activity was as much peripheral to the educational research community in 1964 as the community itself was peripheral to the field of education.

An Estimate of R, D, and D Personnel in Education in 1964

The object of this section is to extend beyond the minimum levels of personnel established earlier in this chapter to establish an over-all estimate of R, D, and D personnel in education which can be employed as a base supply and demand figure for 1964 against which the impact of ESEA for the years 1965 and beyond can be assessed. Table 8, as a consequence, will be rebuilt to reflect not just respondents to one questionnaire study, but an actual estimate based on all available data for July 1, 1964.

Schools and Colleges of Education

Data already presented led to the conclusion that no fewer than 860 professors in schools and colleges of education would have to be considered members of the educational R, D, and D community in 1964. Granting the worst possible conditions for this report, i.e., that the non-respondents in the National Register and Buswell studies were identical to the respondents, the maximum estimate that could be made for school of education R, D, and D personnel would be roughly double that identified, or approximately 1,700.[29]

This range might be used for projection purposes, or a mid-point might be arbitrarily selected. Obviously neither the minimum nor the maximum is a reasonable estimate. Surely researchers were missed in the two studies which formed the minimum base, and, equally surely, the studies did not miss the population by 100 percent. If an effort were made to re-analyze the setting by some sub-groups within the setting, additional credibility might be attained by successive approximations to a rational mid-point.

There are data, not previously employed, in regard to certain of the sub-groups. Sieber sought out the research coordinators and stimulators as a part of his CRP Project No. 1974; and a complete return from deans of schools and colleges of education offering the doctorate in 1964 indicated that 38 such individuals were functioning on a full- or part-time basis.[30] This is 23 higher than the number specified in Table 8, but the 23 cannot simply be added to the grand total in the table because it is quite likely that many, if not most, of these persons were formerly classified in the individual R, D, and D category; nonetheless this figure of Sieber's should be substituted for the 15 previously employed in Table 8 as a move is made toward a final estimation of R, D, and D totals.

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[29] The Buswell questionnaire response, as noted earlier, was 60 percent. The National Register questionnaires represented 5,000 of 12,000 mailed originally.

[30] Sieber, op. cit., p. 17.

Sieber also surveyed research bureaus or institutes and noted that his population of 64 research units represented nine tenths of all such units in schools of education in 1964.[31] It might then be assumed that in all there were approximately 73 such units in existence. Sieber found further that his sample of such units had 2.2 full-time staff assigned to carry out their functions.[32] This would provide a total of 161 persons in this category contrasted with the 134 noted in Table 8. This is a good comparative figure, since both studies were likely to have identified persons in the sub-category consistently and correctly. The Sieber figure is, of course, the more accurate, since he specifically sought to identify the units and the personnel. A corrected total for Table 8 to this point would be:

Category	Table 8 figure	Adjusted figure
R, D, D Program Directors and Staff	134	161
Stimulators and Coordinators of R, D, and D Activities	15	38
TOTAL	149	199

Little can be done with the R, D, and D project directors and staff except to note that most of them were classified as individual R, D, and D personnel and that the 39 specified in Table 8 should probably be moved to the hard-core sub-category under individual R, D, and D personnel. If this were done, that sub-group would be increased to 81 and the total group to 708.

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[31] _Ibid._, p. 19.

[32] _Ibid._, p. 94.

The critical estimate, because of the numbers involved, is of this group of individual R, D, and D personnel and here, too, Sieber provided some additional data. He noted that, in addition to the 2.2 staff assigned full time to bureaus, 3.1 have some type of part-time connection and 8.2 faculty per school indicated that the bureau facilitated their work.[33] Assuming that the faculty would have to have some connection with the R, D, and D community, either to be affiliated part-time with such a bureau or to have their work facilitated by it, this would provide a total of 73·11.3, or 825 researchers in schools of education. This figure might, then, be substituted for the revised estimate of 708 in this category, and the proportional underestimate in Table 8 turns out to be roughly the same for full-time R, D, and D program directors and staff and individual R, D, and D personnel, that is, $\frac{134}{161}$ = 83.2 percent and $\frac{708}{825}$ = 85.8 percent. Actually the underestimate in the latter category is more pronounced than in the former, since the Table 8 sample of individual R, D, and D personnel included researchers in schools of education which did not have bureaus or institutes and these schools were not included in the Sieber study.

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[33] *Ibid*.

If the minimum were increased to reflect the adjustments made so far, it would be increased to 1,024 (161 + 38 + 825).

From this point on, further narrowing of the band is almost guess work. In 1963-1964 there were 107 schools of education offering the doctorate and only 73 were used for the projection of R, D, and D personnel up to this point. The estimate for the 73 schools used earlier amounted to approximately 11 researchers per unit cited as individual R, D, and D personnel. If the same number were attributed to the remaining 34 schools (an obviously generous attribution) the total in the individual R, D, and D category would rise to 1,199--this, when added to the 199 in other categories, provides a maximum of approximately 1,400 across schools of education. The only other group left out are the small number of researchers outside schools of education which offer doctoral programs in education, and they would seem to be more than compensated for by the generous assignment to the 34 institutions not having research units. The range is probably somewhere in the neighborhood of 1,100-1,300, and this study will adopt 1,200 as a reasonable total, spread across the functional emphases in job assignment as follows:

Category	Approximate number
R, D, and D Program Directors and Staff	160
Stimulators and Coordinators of R, D, and D Activities	40

Category (Continued)	Approximate number (Continued)
Individual R, D, and D Personnel[34]	
Hard-core Producers	115
Regular Producers	265
Occasional Producers	620
TOTAL	1,200

Schools and Departments of Psychology

Table 8 set the minimum for educational R, D, and D personnel in schools and departments of psychology at 359. Again assuming the worst construction for the non-respondent group in the National Register study, the upper limit can probably be set at 720. Unfortunately, no data existed which would refine sub-groups within the category, as was the case for the school of education researchers.

About the only approach left to refinement of this category is to assume that underrepresentation within the university categories is consistent across categories. This is obviously not an unassailable assumption. The study was sponsored by an educationist professional fraternity (Phi Delta Kappa), which may have caused educationists to respond in greater numbers. By the same token, educationists should be expected to have a somewhat greater interest in appearing in a register of researchers in education. Lacking a better starting point, however, the assumption will be used, and it results in a total for this category of 503, i.e., $\frac{857}{1,200} = \frac{359}{503}$.

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[34] Distribution of personnel within this category is based on the percentage distribution in Table 8.

Happily, and hopefully not by happenstance, this assumption is reasonably well supported by the Sieber analysis of CRP proposals. Somewhat more than half of his non-educationist group would have been classified by this project staff as appearing in schools and departments of psychology, i.e., 9 percent whose discipline was identified as educational psychology, 33 percent identified as "other psychology," and 9 percent identified as either special education or guidance--all outside schools of education.[35] Table 8 shows 46.7 percent of the professors outside of schools of education located in schools and departments of psychology. With no better data available, and with the similarity of distribution in the two samples supporting the assumption, an increase to 500 in this category is probably as close as it is possible to arrive at a firm estimate.

No data are available to improve on the Table 8 distribution among categories. Again the project staff will be integrated with the hard-core producer category, and the distribution will be made using Table 8 categories:

Category	Approximate number
R, D, and D Program Directors and Staff	70
Stimulators and Coordinators of R, D, and D Activities	--
Individual R, D, and D Personnel	
Hard-core Producers	46
Regular Producers	150
Occasional Producers	234
TOTAL	500

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[35] *Ibid.*, Appendix A, p. 37.

Other College and University Departments

Applying the same assumption used for the schools and departments of psychology (i.e., consistent underrepresentation within the university categories), the estimate for behavioral and social science departments would increase from 266 to 372 and for other discipline and academic departments from 144 to 200. Without additional data available, there seems to be no route of refinement in these categories other than the technique which has already been applied. Consequently, this procedure was followed and the results are:

Category	Approximate number
Behavioral and Social Science Departments	
R, D, and D Program Directors and Staff	64
Stimulators and Coordinators of R, D, and D Activities	1
Individual R, D, and D Personnel	
Hard-core Producers	60
Regular Producers	106
Occasional Producers	139
TOTAL	370
Other Discipline and Academic Areas	
R, D, and D Program Directors and Staff	20
Stimulators and Coordinators of R, D, and D Activities	14
Individual R, D, and D Personnel	
Hard-core Producers	28
Regular Producers	52
Occasional Producers	86
TOTAL	200

College and University Administration Units

This category has two distinct sub-groups which should be considered separately. The individual R, D, and D personnel were almost all occasional producers--former professors, currently general university administrators, who were attempting to maintain their identity with their scholarly community or who had some assignment which involved them tangentially in the field of institutional research. Their research productivity was and will remain incidental to the major thrust of their professional life. They represent neither a large number nor a significant pool of R, D, and D manpower. On the other hand, the bulk of this category, and a significant R, D, and D personnel pool, is represented by the institutional researchers who spend a substantial portion of their time on R, D, and D activity.

The only data available to refine the Table 8 estimates in this category were (1) a roster of participants at the 1964 National Institutional Research Forum and (2) a current (1967) list of members of the Association for Institutional Research.[36] There were 146 participants in the former and 355 full and active members in the latter. Both listings were obviously underestimates, and the forum attendance should have been much less complete than the association membership.

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[36] These lists were provided by Wilbur Tincher, Director of the Division of Educational Services at Auburn University and 1967 Secretary of the Association for Institutional Research.

Counterbalancing the underestimation is clear evidence from job titles included on the lists that many did not fall appropriately in the category, e.g., Office of Education personnel, representatives of professional associations, private research agencies, etc. And, unfortunately, in both instances there were cases where the data on the title were insufficient to allow classification--8 in the forum listing and 49 in the association list.

There were, however, "pure" cases that could be used as a base for further projection. In the 1964 listing, 83 cases were designated by title as institutional researchers for a single institution or a state system of institutions of higher education. This represents an increased minimum estimate from the 62 cases noted in Table 8. A comparable figure in the 1967 association listing was 206.

In both listings there were significant numbers of administrators with general administrative designations, e.g., Dean, Vice President, Registrar, etc., who wished to identify with the institutional research group but whose primary responsibility obviously lay elsewhere. Many of these individuals may have been involved only because their institution was planning to formalize the function but had not, as yet, done so. The 1964 listing included 28 such individuals, and 60 were represented in the 1967 data.

The key projection group is represented by those institutional researchers who could be classified clearly as

R, D, and D Program Directors and Staff. There can be no less than 83 and probably, for 1964, no more than the 200 such persons who appeared on the 1967 membership list of the Association for Institutional Research. The degree of incompleteness of the latter listing is uncertain, but in an emerging field it is likely that full-time institutional researchers would be anxious for association identification. Without data to provide further refinement, an estimate of 150 such individuals will be used.

In the individual R, D, and D category, there seems to be no more effective technique for refining the estimate than to use the correction applied in the previous categories. This does not account for the general administrators who sought identification with the institutional research community, but their interest and involvement in research in education is tangential at best. The estimate in this category is as follows:

Category	Approximate number
R, D, and D Program Directors and Staff	150
Stimulators and Coordinators of R, D, and D Activities	---
Individual R, D, and D Personnel	
Hard-core Producers	---
Regular Producers	7
Occasional Producers	49
TOTAL	206

Federal Agencies

The most directly relevant setting in this category, and the only one upon which additional data were available, was the United States Office of Education. Personnel in this agency in 1964 who responded to the survey were either (1) research bureau directors and staff, i.e., staff of the statistics division of the Office, (2) stimulators and coordinators, i.e., administrators of research support programs, (3) individual researchers, i.e., substantive specialists who conducted individual studies, or (4) institutional researchers, i.e., staff assigned to gather data on the effectiveness of Office of Education operation.

No precise breakdown in these categories was possible from personnel data regularly available for the Office of Education in 1964, but some fairly accurate figures were constructed. The institutional research category, as reported in Table 8, was probably not far off target. It was post-1964 when the Office began to formalize the process of gathering systematic data on its operations. If there were more than the two reported, it would have been a handful. The current institutional research arm of the Office--Office of Program Planning and Evaluation--was at that time labeled an Office of Program and Legislative Planning, and evaluation appeared to play a small part in its operation.

The educational statistics unit on June 30, 1964, had 115 total positions[37] of which approximately one third were clearly professional positions.[38] This would indicate that the 18 positions assigned to this category in Table 8 should have been approximately doubled, and for estimation purposes this was set at 35.

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[37] This figure was obtained from the monthly "Status of Personnel on Duty" report of the Office of Education dated June 30, 1964.

The bulk of the research administration positions in 1964 were covered by the Cooperative Research Program staff, and most appeared to have been identified in the survey. However, including those assigned to vocational education, handicapped children and youth, and those who were initiating the Educational Research Information Center and the university-based R and D center program, the number was probably nearer to 20.

The specialists were difficult to estimate and hard to classify. There were certainly at least 68 and probably closer to 100. By the time the Status of Personnel Report for USOE for 1964 was developed these positions had, for the most part, been integrated in the Bureau of Educational Research and Development and were part of a pool of some 300 positions included in the Bureau. Considering support staff, the estimate of 100 would not be far from wrong. These figures, assigned to the basic categories, ran as follows:

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[38] This ratio of one professional to two support staff members was derived from a line item count of personnel in the statistics unit in 1967 obtained from an Office of Education Personnel Retrieval System printout, and was confirmed with an Office of Education personnel officer.

Category	Approximate number
R, D, and D Program Directors and Staff	37
Stimulators and Coordinators of R, D, and D Activities	20
Individual R, D, and D Personnel	
Hard-core Producers	31
Regular Producers	46
Occasional Producers	23
TOTAL	157

The remaining two settings in this category were eliminated at this point for three reasons. First, refinements in the figures to the point where a credible estimate could be made was impossible without mounting a special data gathering project for that purpose. It would have been unreasonable even to assume that the range in military agencies, for example, was a maximum of 2:1, since the publications and associational affiliations of these personnel are of such a nature that the search techniques on which the National Register study was based would not have been likely to unearth half the potential respondents. Secondly, most of those involved in the categories were tangential to the main flow of research in education. For example, nearly half the respondents in the "Other Federal Agencies" grouping were psychologists assigned to Veterans Administration hospitals whose work may have had relevance for education but who were not concerned centrally with the process of education. Finally, these settings held little potential for rapid growth over the next 10 years, so their elimination would not, in the opinion of the staff on this project, seriously affect the projections in the study. Additional sub-categories which will be eliminated later in this chapter will also fit these three criteria. Inability to refine projections will not be used alone to do this, since it is reasonable to anticipate that, for example, although the extant estimate in business and industrial organizations cannot be markedly sharpened, this setting will experience rapid growth over the next several years, particularly in the areas of development and diffusion.

State Agencies

Having justified elimination of sub-categories, the option will be exercised immediately on the "Other State Agencies" group. The cases in this category fit perfectly the criteria just established.

The state education agency grouping was definitely underestimated in Table 8. The extent of the underestimate is debatable. A recent publication of the Office of Education reported 204 professional personnel in the states involved in social bookkeeping tasks and 300 engaged in a category labeled program planning and research.[39] That estimate reflected the input of ESEA funds and included primarily those concerned with research or statistics divisions of state education agencies (47 of the 74 cases presented in Table 8). The estimate was generous in the definition of research activity; but it did indicate dramatically that the National Register survey failed to tap-in to a pool of research and research-related personnel in education, and provoked the staff to turn to a more relevant data source. A count was conducted of all persons in state education agencies listed in the Education Directory for 1964 whose title included reference to statistics, research, special projects, research administration, or institutional research, and 239 cases were identified.[40] This is probably a valid figure to substitute for the 47 previously noted.

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[39] Reinforcing the Role of States in Education, op. cit., pp. 67-68.

The stimulators and coordinators category was underestimated by some small number but not by much. Established R and D grant programs to agencies within states existed in only six states in 1964 (California, Georgia, New York, Utah, Virginia, and Washington),[41] and significant funds that would have required the full-time attention of a professional staff were only available in New York State.[42] This category was increased from 4 to 10 cases.

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[40] Office of Education, Education Directory 1964-1965: Part 1 State Governments, United States Department of Health, Education, and Welfare, United States Government Printing Office, Washington, D. C., 1965, pp. 3-89.

[41] Office of Education, Research in State Departments of Education, United States Department of Health, Education, and Welfare, bulletin 1965, no. 26 (OE-23040), United States Government Printing Office, Washington, D. C., 1965.

[42] Ibid., p. 21.

No additional data were available to refine the individual R, D, and D category in state education agencies. This group, at best, were not involved heavily in R, D, and D activity, as was indicated by the fact that 13 of the 20 respondents placed themselves in the occasional researcher category. In lieu of better data, the increase applied to this category was the same as for the program directors and staff, although this probably represents some overestimation for this sub-group.

The adjusted figures for state education agencies, then, are:

Category	Approximate number
R, D, and D Program Directors and Staff	240
Stimulators and Coordinators of R, D, and D Activities	10
Individual R, D, and D Personnel	
Hard-core Producers	25
Regular Producers	25
Occasional Producers	65
TOTAL	365

Schools and School Systems

None of the data which were available for refining the estimates in this category distinguished local public school systems from other systems, e.g., county or intermediate units, so this distinction was eliminated and the 220 cases reported were considered the minimum estimate for the overall group.

An impression of the staff is probably worth reporting at this point. In reviewing the questionnaires and comparing the proportion of time devoted to research with reports on current and prior research efforts, it appeared that public school personnel in the individual researcher category were more generous to themselves in allocating time spent on research than was the case for the college and university sample. Most of them were classroom teachers, and 87 percent indicated only about a day a week devoted to R, D, and D. The staff felt it quite likely that few, if any, of the 53 occasional producers in the school system category would have indicated 20 percent of their time devoted to research had they been reporting from the university setting. Consequently, little increase will be granted in this category but it will be retained, since marked changes in the group will occur inevitably over the next few years as the impact of ESEA is brought to bear on these settings.

In the research program category, the National Education Association provided some specific data in a publication entitled Research Units in Local School Systems. This report noted that approximately 130 research units of a formal type existed in local school systems as of July, 1965, and an analysis of staff descriptions for 108 of these units indicated that there were approximately 230 full-time-equivalent (FTE) staff members in these school districts working on research in 1964-1965.[43] This is the first time the concept of FTE has been introduced in this study, and obviously an adjustment will have to be made to make these figures comparable to those in other sections. To adjust the FTE figures to a head count, units which estimated that they spent 70 percent or more of their time on research were classified as R, D, and D program units and their professional staff members were counted individually as R, D, and D personnel. There were 50 such units employing 196 professional persons. For units spending less than 70 percent of their time on research, the personnel were reclassified as individual R, D, and D personnel, with those employed in units spending 30 to 60 percent of their time on research being classified as regular producers and those spending less than 30 percent being classified as occasional producers. If these rules were employed in analyzing the NEA data, the total would be:

Category	Number
R, D, and D Program Directors and Staff	196
Regular Producers	69
Occasional Producers	46
TOTAL	311

The first of the above figures should be comparable to "R, D, and D Program Directors and Staff" in other categories. The second two categories will be straight additions to the "Individual R, D, and D" category in this setting.

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[43] "Research Units in Local School Systems," *Educational Research Service Circular*, circular no. 5, pp. 3-36, Washington, D. C., July, 1965.

Even this increased estimate is too low. There were 22 non-respondent districts in the NEA survey, and the survey only sampled districts of less than 25,000 enrollment by selecting "a group of relatively smaller districts identified by various means as places where research units might exist."[44] The smaller districts probably represented no major increase in personnel. The modal smaller district in the sample was a one man operation, and the median time spent on research in the one man district was 50 percent. It would probably be reasonable to add approximately 30 cases each to the regular and occasional producers, bringing these totals to 100 and 75 respectively. Adding the 22 non-respondents to the category picked up some 65 persons, if it is assumed that the non-respondents had units similar to those of the respondents (an average of about three persons per unit). These cases were distributed proportionately across the three categories (as the original group of 311 fell) before adding in the personnel from smaller districts. This revised the total as follows:

Category	Number
R, D, and D Program Directors and Staff	237
Regular Producers	113
Occasional Producers	86
TOTAL	436

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[44] *Ibid.*, p. 1.

Retained in this setting and added to this revised total were the individual researchers reported in Table 8. The only serious underestimate which still may exist in the category was that of teachers who might have been classified as developers or diffusers, that is, teachers working on locally sponsored curriculum projects directed toward providing better solutions to operating problems. Since school districts in 1964 had such modest formal provision for using school district personnel for this purpose, the deficit, which was not estimated, was probably small and was restricted almost entirely to the occasional producers category. The revised estimate in this setting, then, is as follows:

Category	Approximate number
R, D, and D Program Directors and Staff[45]	265
Stimulators and Coordinators of R, D, and D Activities	5
Individual R, D, and D Personnel	
Hard-core Producers	10
Regular Producers	120
Occasional Producers	140
TOTAL	540

Private Research Institutes and Agencies

This was a very difficult category to estimate. Many of the publications of researchers in such settings end up in the form of a report to a client and are not unearthed in regular professional literature; and no professional or governmental agency has undertaken the collection of any systematic data on such units.

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[45] The number in this category includes the 28 cases reported in Table 8 under the heading "Other Schools and School Systems."

The first step taken was the elimination of the second sub-category in this setting--"Private Social Service and Welfare Agencies." There were few cases in this category and they were quite heterogeneous in type. Oen fourth were psychologists in private practice who reported some research "to keep their hand in" the research community. Many of those in the program director category (one third) were one-man research and service operations functioning on a consultant basis. Whether or not the National Register survey, on which Table 8 was built, contacted such individuals seems almost to have been a matter of happenstance.

In the private research institute grouping, most of the respondents were from major national institutes such as ETS, AIR, SDC, and SRA. Few responses seem to have been received from survey consulting firms which work individually with school districts. This latter group would have increased the development category if the type of service they render could be defined as devising generalizable solutions to operating problems. Up to this point, the development activities of the reporting agencies seemed to be restricted primarily to test development.

The only method available to check on the accuracy of this category seemed to be an examination of staffs in individual agencies, and this technique led quickly to the conclusion that the category had been grossly underestimated. The 1964 Annual Report of the American Institutes for Research listed 40 professionals working on programs directly relevant to education, e.g., instructional methods programs, training and education program, etc.[46] The Annual Report of the Educational Testing Service could alone have accounted for the number of respondents from Table 8 in this category depending upon the functional categories included in the count, e.g., 38 in test development, 27 in individual research groups, and 20 in developmental research.[47] There was a peculiar characteristic of these staffs which distinguished them from all other reporting groups. They employed large numbers of technical support staff who were professionals but who were not independent researchers in the same sense as were individual researchers found in other settings. They appeared to take the place of the graduate assistant in the college and university setting but had much higher levels of technical competence growing from experience on a number of projects. The technical support personnel represented the bulk of staff from those agencies who did not respond to (perhaps were not identified by) the National Register survey.

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[46] Annual Report: American Institutes for Research in the Behavioral Sciences, American Institutes for Research, Spring, 1964, pp. 33-34.

[47] Educational Testing Service Annual Report: 1963-1964, Educational Testing Service, Princeton, New Jersey, 1965, pp. 98-101.

These data simply (1) confirmed the underestimate and (2) indicated that those not counted were chiefly second-line professional personnel. They offered little indication of the extent of underestimation. Almost by guess, 300 persons were assigned to these agencies. The larger units, e.g., ETS, AIR, of which there were a limited number, employed somewhere in the neighborhood of 50 educational research personnel each. Assuming a scattering in other agencies, 300 was the number arbitrarily assigned to the category and no attempt was made to distinguish them on a sub-category basis in terms of functional emphasis in job assignment.

Professional Education Associations

Staff in related professional associations were dropped from this category. The remaining staff, in professional education associations, were almost solely personnel in research divisions and appeared to be underestimated by at least 50 percent. The single largest group of such persons were employed in research divisions of state teachers associations, and in 1964, according to a report from the National Association of State Teachers Associations, the associations across the country employed 42 researchers.[48] Added to this group were the executive staffs from the national associations whose job it was to conduct research or disseminate the findings of research. The largest group in this category was employed by the National Education Association; in 1964-1965 there were 14 such staff members in the research division.[49] Just as was the case in USOE, a certain group of those employed in specialist positions in the association spent a portion of their time on research, and this group, with no respondents showing in the Table 8 survey, were nearly impossible to estimate. It is probably true that, for the most part, those who existed were in the occasional researcher category.

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[48] "Directory of Staff Members of State Education Associations, 1964-1965," in Information Service Report of the National Association of Secretaries of State Teachers Associations, no. 117, NASSTA, Washington, D. C., November, 1964, p. 20.

Most of the national professional education associations other than NEA had small central staffs and few staff members involved in a unit which could be described as an R, D, and D program unit. Even AERA, whose executive staff employees could be labeled research coordinators or stimulators, functioned in 1964 with a staff of one. It would probably not be far from the actual figure to increase the 56 found in the research divisions of state education associations and the NEA to a total of 90, on the assumption that the sample of 46 presented in Table 8 represented half of the universe of respondents.

Inter-agency Organizations

This category will be passed over lightly but retained because of the obvious implications of the educational laboratories for future projections. It is underestimated. As has been mentioned earlier, there were few respondents from the course content improvement programs, although they fall well within the definition of R, D, and D personnel in this study. Most of those who did respond were staff in intra-state regional school improvement agencies, such as the Research Council of Greater Cleveland. With little substantiation for the estimate, the total number in the category will simply be doubled to 50 to retain attention on the setting.

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[49] "Selected Statistics of Local School Systems, 1964-1965," in Research Report 1966-R13, NEA Research Division, Washington, D. C., 1966, p. 1.

Private Foundations

This category will be eliminated. Only seven cases were reported in the National Register survey, and the effect of the foundations on the demand for educational R, D, and D personnel is through their funding policies rather than through the research productivity of their staffs. With few exceptions, e.g., Russell Sage Foundation and Kettering Foundation, they have not maintained in-house R, D, and D capabilities.

Business and Industrial Organizations

The 47 respondents from this setting were an under-representation, but no data exist to refine the estimate. Many of those who did not respond or were not identified would undoubtedly have been classified as developers. The process of development in education was in such an embryonic state that, perhaps, failure to have identified them does not cost the project much in establishing a projection base. With no better data to use, this category was increased to roughly the same extent as was the private research institute grouping, i.e., 3:1.

Summary

The final estimate of 4,125 R, D, and D personnel in education in 1964 is presented in Table 9. A few observations can be made which may summarize characteristics of the R, D, and D community at that point in time:

1. There were approximately 4,125 R, D, and D personnel active in the educational research community in 1964. Most of them (60 percent) were located in colleges and universities. About half of the college and university group were in schools and colleges of education. The largest groups outside the university setting were located in state departments of education and local school systems (circa 20 percent).

2. About one third of the total group spent less than one third of their time on R, D, and D activities.

3. Non-university agencies tended to organize for R, D, and D, i.e., less than 30 percent of the persons found in non-university settings could be classified as individual R, D, and D personnel, while in the university setting nearly 80 percent were so classified.

4. The Elementary and Secondary Education Act of 1965 seemed to have been directed intentionally toward weaknesses in the educational research community in 1964:

a. Support for individuals in the college and university setting (where the largest group of researchers lived) was not substantially increased, but support for organized research in this setting was boosted.

b. Support for project research in school systems was increased sharply, though little individual R, D, and D manpower strength existed in that setting.

c. Inter-agency organizations were nearly unheard of, but the ESEA pumped support into a national network of such agencies.

d. Development and diffusion were barely represented as functional emphases for the researchers of 1964, but they predominated as activities to be fostered under ESEA.

e. Non-university settings possessed a minority of the R, D, and D personnel, but ESEA broadened support authority under P.L. 531 to include participation by such agencies.

TABLE 9. ESTIMATED NUMBER OF R, D, AND D PERSONNEL BY AGENCY SETTING AND FUNCTIONAL JOB EMPHASIS--1964

Setting	R, D, and D program directors and staff	Stimulators and coordinators of R, D, and D activities	Individual R, D, and D personnel			Total
			Hard-core producers	Regular producers	Occasional producers	
Schools and Colleges of Education	160	40	115	265	620	1,200
Schools and Departments of Psychology	70	--	46	150	234	500
Other Behavioral and Social Science Departments	64	1	60	106	139	370
Other Discipline and Academic Areas	20	14	28	52	86	200
College and University Administration Units	150	--	--	7	48	205
U. S. Office of Education	35	20	31	46	23	155
State Departments of Education	240	10	25	25	65	365
Schools and School Systems	265	5	10	120	140	540
Private Research Institutes and Agencies	300	--	--	---	---	300

TABLE 9. (Continued)

Setting	R, D, and D program directors and staff	Stimulators and coordinators of R, D, and D activities	Individual R, D, and D personnel			Total
			Hard-core producers	Regular producers	Occasional producers	
Professional Education Associations	90	--	---	---	---	90
Inter-agency Organizations	50	--	---	---	---	50
Business and Industrial Organizations	150	--	---	---	---	150
TOTAL	1,594	90	315	771	1,355	4,125

Whether accidental or intentional, the ESEA of 1965 highlighted the major personnel needs in educational R, D, and D in bold relief.

The Production of R, D, and D Personnel in Education in 1964

In manpower terms, the 4,125 R, D, and D personnel specified in Table 9 might be considered the operational demand for such individuals in education in 1964. Since there appears to have been no manpower crisis which was being reported in the literature, one might infer that supply and demand had attained some sort of balance. This section will examine the source of the supply and the quantitative production characteristic of education in 1964 and the years immediately preceding that date.

Manpower Supply Centers

There are some characteristics unique to the supply of R, D, and D personnel in education in 1964 which might be helpful as a backdrop for the later sections on projection. The pre-service supply responsibility had been turned over to the graduate schools of colleges and universities in this country--particularly to schools of education. And the most outstanding feature of these supply centers was their paucity in number. With over 100 institutions awarding the doctorate in 1964:

1. Buswell reported that "60 percent of the persons in the research group (two or more research publications) came from 10 universities."[50] And Buswell went on to enumerate these institutions as follows:

(1) California (Berkeley)
(2) Illinois
(3) Indiana
(4) Michigan
(5) Minnesota
(6) New York University
(7) Oregon
(8) Teachers College, Columbia University
(9) Texas
(10) Wisconsin

2. In the decade 1952-1961, Bargar reported only 12 institutions which awarded the highest level degree to members of his analysis group (self-defined researchers) at a rate of more than four per year.[51] They were:[52]

(1) Chicago
(2) Harvard
(3) Illinois
(4) Indiana

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[50] Buswell, _et al_., _op_. _cit_., p. 37.

[51] The assumption was made that production of "researchers" at less than this level could be attributed to happenstance rather than design.

[52] Bargar, _et al_., _op_. _cit_., p. 99.

(5) Iowa

(6) Michigan

(7) Minnesota

(8) New York University

(9) Ohio State

(10) Teachers College, Columbia University

(11) Texas

(12) Wisconsin

3. When Sieber asked deans of schools of education and coordinators of research in such schools to name the graduate schools of education doing the best research, he received only 22 nominations in all, and of the 46 deans and coordinators replying to the question, only 10 schools were mentioned as many as five times, to wit:[53]

(1) California (Berkeley)

(2) Chicago

(3) Harvard

(4) Illinois

(5) Michigan

(6) Minnesota

(7) Ohio State

(8) Stanford

(9) Teachers College, Columbia University

(10) Wisconsin

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[53] Sieber, op. cit., Appendix C, p. 2.

In Table 10 the three listings are combined and indicate that only 15 institutions are identified as appearing even once on criteria which would not seem to be difficult to meet if, in fact, an institution could be considered a center for training researchers in education. The total number of 15 was further substantiated by Sieber's questionnaire to deans of schools of education asking about provisions for research training. In his sample of 64 schools, 25 indicated that they neither emphasized research training nor provided a program for training researchers in education. He commented further:

> Only 3 percent of the schools have a program other than the regular degree program and _also_ emphasize research training. Another 14 percent, however, emphasize research training and provide for it through the regular degree program; which yields _17 percent which both emphasize research training and provide some form of program for students who want to make research a career_. In other words, only a small minority of schools of education were making serious efforts to train educational researchers at the time of our survey in 1964-1965.[54]

Seventeen percent of the Sieber sample amounted to 11 institutions.

Quantitative Estimate of Production

The Bargar, Buswell, and Sieber reports each provided concrete empirical evidence on the number of educational R, D, and D personnel being prepared by American colleges and universities in the years prior to 1964.

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[54] _Ibid_., pp. 257-258. Underlining appears in the original.

TABLE 10. GRADUATE SCHOOLS OF EDUCATION IN 1964 CITED IN THE BARGAR, BUSWELL, OR SIEBER STUDIES FOR PRODUCTION OF RESEARCHERS OR RESEARCH

Institution	Study in which cited		
	Bargar	Buswell	Sieber
California (Berkeley)		X	X
Chicago	X		X
Harvard	X		X
Illinois	X	X	X
Indiana	X	X	
Iowa	X		
Michigan	X	X	X
Minnesota	X	X	X
New York University	X	X	
Ohio State	X		X
Oregon		X	
Stanford			X
Teachers College, Columbia University	X	X	X
Texas	X	X	
Wisconsin	X	X	X
TOTAL NUMBER = 15	12	10	10

1. Bargar estimated that "at least 413 potential researchers will be graduated in 1966."[55] In his analysis group (3,923 persons), 2,065 individuals received their highest level degree during the decade 1952-1961--an average of 206.5 per year.[56]

2. Sieber reported, from his dean's questionnaire, that in the previous three years the mean proportion of graduates who had entered research jobs in higher education, school systems, state departments, and research agencies immediately after receiving the degree was 6.3 percent.[57] For the years in question, the number of doctoral recipients in education were:[58]

Year	Number of Doctoral recipients
1962	1,737
1963	1,943
1964	2,191

Using Sieber's percentage this would have resulted in 109 researchers graduating in 1961-1962, 122 in 1962-1963, and 138 in 1963-1964. Those who moved into primary research positions immediately after the doctorate were, of course a much more restricted group than was represented in Bargar's sample.

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[55] Bargar, et. al., op. cit., p. 95.

[56] Ibid.

[57] Sieber, op. cit., p. 259.

[58] Office of Education, Projections of Educational Statistics to 1974-75, United States Department of Health, Education, and Welfare, circular 790, p. 24 (OE-10030-65), United States Government Printing Office, Washington, D. C., 1965.

3. In the Buswell sample of recipients of the Ed.D. and the Ph.D. in education in 1954, 101 (or 12.3 percent) produced two or more research publications in the first 10 years following the doctorate.[59] If this percentage were used for the school years 1962-1964, an average of 241 researchers per year would have been produced.

Although each of these studies employed varying criteria in defining researchers, they did provide a range within which to function. Sieber and Buswell restricted their estimates to doctorates in education, and it would seem reasonable to estimate from their data that a small percentage, probably not more than one of ten graduates of doctoral degree programs in education, ended up as research or research-related personnel in the years around 1964. In the school year 1964, this would have produced some 220 potential researchers in education. This does not account, however, for researchers in education whose primary discipline background was not in education. Most of these individuals would end up employed in university settings in departments other than education and, referring to Table 9, probably represent about one fourth of the population of research personnel in education. Another 90 potential researchers in education might be attributed to this source.

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[59] Buswell, *et al.*, *op. cit.*, p. 9.

This total of 300 holds up fairly well in comparison with Bargar's estimate of 413. Actually, had he used 1964 as his base year rather than an average based on 1952-1961, his total would have been increased by from one fourth to one third, since the total number of doctorates was on the rise from only a bit more than 1,300 in 1951-1952 to the total of nearly 2,200 in 1964. A comparable estimate from the Bargar data, then, would have been in the range of 500 to 600. However, Bargar's estimate is based on a population of 8,000 researchers, nearly double that used as the final estimate of R, D, and D personnel as defined in this report.[60]

Summary

In terms of the supply of R, D, and D personnel in 1964, this report concludes that:

1. There were few centers of graduate research training in education in 1964, certainly not more than 15 such institutions.

2. These institutions produced 200 to 250 potential researchers per year from a total graduating class of over 2,000.

3. Another 50 to 100 degree recipients in other fields for the school year 1963-1964 would eventually become active in the educational R, D, and D community.

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[60] The reader should recall that the Bargar population accepted at face value all respondents to a questionnaire, and that the application of the modest criterion of 20 percent time devoted to research cut the questionnaire sample by nearly 50 percent.

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4. A total output of some 300 researchers per year was characteristic of the R, D, and D community in 1964.

Summary

In this chapter an attempt has been made to (1) provide a general description of the educational R, D, and D community in 1964, (2) extend this description to an analysis of the community by institutional settings and functional emphases of researcher's roles, (3) estimate the actual population of the community to furnish a base for projections of future manpower demands, and (4) estimate the supply of researchers being fed into this community. The four section summaries serve well as an over-all summary and will be repeated at this point in the hope that this broad-brush picture will remove some of the obfuscation which may have occurred as a consequence of the proceedural, logical, and arithmetical manipulations performed in the chapter.

General Description

1. In 1964 research in education had not been institutionalized; it was an individualistic pursuit.

2. The investigations were fragmentary and small scale efforts.

3. The educational researcher was a part-time functionary.

4. Most educationists were not involved directly in the research field--their productivity as researchers was miniscule.

5. Change was slow to come to the field--despite increases in federal funds little difference could be observed from 1954 to 1964.

6. Research was not central to the operation of most schools of education and, inferentially, to the operation of elementary and secondary schools.

7. The input of new researchers to the field of education was small-probably not more than one of ten doctoral graduates in education.

8. The field was inhabited chiefly by researchers with a background in psychology or educational psychology.

9. Most of the research effort was university-based.

10. The research effort was centered for the most part in 10-20 universities offering the doctorate in education.

Role Characteristics

1. The preponderance of R, D, and D personnel in 1964 were located in college and university settings functioning as individual researchers on a part-time basis.

2. Most individual researchers reported devoting part-time to R, D, and D activity and the modal time reported was very much part-time--one fifth to one third time.

3. Research personnel located in schools of education were those most likely to be spending a small percentage of time on their research activity.

4. Within the college and university setting some 50 percent to 60 percent of the R, D, and D personnel were affiliated organizationally with a school or college of education.

5. USOE research personnel in 1964 were either working as social bookkeepers or as specialists conducting discrete studies in substantive areas.

6. State department of education personnel were chiefly normative researchers employed in research divisions.

7. Schools and school systems were represented by some teachers, counselors, and administrators working for a small percentage of their time on R, D, and D projects, and by data gatherers functioning in a research division.

8. Few development and diffusion personnel seemed to be functioning in the R, D, and D community in 1964 and even fewer were identified through the questionnaire and search techniques employed in the study. However many might have been located by different techniques, it does seem clear that development and diffusion activity was as much peripheral to the educational research community in 1964 as the community itself was peripheral to the field of education.

Quantitative Estimate of Personnel

1. There were approximately 4,125 R, D, and D personnel active in the educational research community in 1964. Most of them (60 percent) were located in colleges and universities. About half of the college and university group were in schools and colleges of education. The largest groups outside the university setting were located in state departments of education and local school systems (circa 20 percent).

2. About one third of the total group spent less than one third of their time on R, D, and D activities.

3. Non-university agencies tended to organize for R, D, and D, i.e., less than 30 percent of the persons found in non-university agencies could be classified as individual R, D, and D personnel, while in the university setting nearly 80 percent were so classified.

4. The Elementary and Secondary Education Act of 1965 seemed to have been directed intentionally toward weaknesses in the educational research community in 1964:

   a. Support for individuals in the college and university setting (where the largest group of researchers lived) was not substantially increased, but support for organized research in this setting was boosted.

   b. Support for project research in school systems was increased sharply, though little individual

R, D, and D manpower strength existed in that setting.

c. Inter-agency organizations were nearly unheard of, but the ESEA pumped support into a national network of such agencies.

d. Development and diffusion were barely represented as functional emphases for the researchers of 1964 but they predominated as activities to be fostered under ESEA.

e. Non-university settings possessed a minority of the R, D, and D personnel, but ESEA broadened support authority under P.L. 531 to include participation by such agencies.

Supply of Personnel

1. There were few centers of graduate research training in education in 1964; certainly not more than 15 such institutions.

2. These institutions produced 200 to 250 potential researchers per year from a total graduating class of over 2,000.

3. Another 50 to 100 degree recipients in other fields for the school year 1963-1964 would eventually become active in the educational R, D, and D community.

4. A total output of some 300 researchers per year was characteristic of the R, D, and D community in 1964.

CHAPTER III

THE TRANSITION: DEMANDS FOR R, D, AND D PERSONNEL--1964-1974

The educational R, D, and D community of 1964 was a small, stable community having only peripheral impact upon American education. An attempt is made here to project changes which are likely to occur in that picture by 1974, primarily as a result of the impact upon it of programs initiated and fostered under the Elementary and Secondary Education Act of 1965. The projections are not predictions. They represent logically-developed conclusions based on general and specific assumptions which are stated. Persons who use the projections are cautioned to review periodically the assumptions and the evidence which supports them and to revise them according to later events and information.

The projections prepared rest on the general assumption that the educational R, D, and D community will not experience events which will alter its situation to any greater extent than did the ESEA of 1965. In other words, the general assumption is made that major political, social, and economic trends of the recent past will, with one caveat, continue. The caveat is that the limitations imposed upon program growth and expansion during fiscal year FY '67-'69 are viewed as unusually stringent and will not be continued during the period FY '70-'74.[1]

In addition to the general assumption, there were specific assumptions made in the preparation of projections for given programs. The reader may wish to challenge these specific assumptions and thereby alter the results projected. In fact, the chapter is organized and presented in a manner which, hopefully, encourages such involvement. However, the reader will discover the fundamental fact that any reasonable set of assumptions must produce heavy and continuing demand for trained manpower. The policy conclusion which must be drawn is that specific attention and intensive effort will be required to meet the need for trained R, D, and D persons in education in 1974 and beyond.

Procedures

Overview

The strategy adopted for making projections of personnel was (1) to relate R, D, and D personnel to the funds available for those purposes, and (2) to project an increase in demand for R, D, and D personnel which was related to projected increases in R, D, and D funds. Required to carry out this strategy was: (1) selection of support programs which created, or appeared likely to create, important demand for

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[1] The reader will find, in the "Funding Projections" section of this chapter, program funding histories which illustrate that the FY '67-69 growth limitations are so unusual that their continuation over any extended period of time is unlikely.

R, D, and D personnel; (2) a description of personnel supported by these programs at a given level of funding; (3) projection of the support funds to be made available to the selected programs (in this case to 1974); (4) projection of the positions[2] which could be supported by the programs to a level equivalent to the projected level of funding; and (5) adjustment of the personnel projections to accommodate positions not supported, and consequently not accounted for, by the selected support programs.

Selection of support programs. The support programs created and fostered by the Elementary and Secondary Education Act of 1965 appeared likely to be by far the primary determiners of the demand for R, D, and D persons during the next several years. The primary data of the study were taken from these support programs in the United States Office of Education (USOE).

The Course Content Improvement Section of the National Science Foundation was also included in the study. The characteristics of the NSF-CCI program were used to project both NSF course content improvement activity and the future characteristics of USOE programs which were expected to undertake course content improvement activities but had not yet begun to do so in FY '66.

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[2] Throughout the chapter the reader will find reference to persons in the FY '66-'68 data, but reference to positions in the projections, because the question of whether the positions which will be available are, in fact, going to be filled with persons is unanswerable at this time.

Description of personnel supported. The tool used to describe the personnel employed on a sample of new projects in the two selected agencies was the Logical Structure for Viewing R, D, and D Roles in Education (Figure 1). The staff classified the personnel according to (1) the setting in which they would be employed, (2) their job assignments, and (3) their area(s) of functional emphasis in the process of research, development, and diffusion.

A four-step process was then followed to extrapolate the description of personnel in the sample of new projects to all projects in progress in all programs visited. First, the personnel in the sample were TABULATED within programs (e.g., Handicapped Children and Youth, R and D Centers) according to the "sub-units" in each program. That is, the number of personnel in the Handicapped Children and Youth (HCY) program were tabulated according to their (1) employment setting, (2) job assignment, and (3) R, D, and D emphases in a small project, regular project, R and D center, or instructional materials center--all of which "sub-units" the HCY Branch used to carry out its program.

Second, the characteristics (i.e., number, settings, job assignments, and R, D, and D emphases) of the personnel tabulated were EXTRAPOLATED to encompass all new projects in the program sampled.

Third, extrapolated totals of new small projects, new regular projects, new R and D centers, and other types of sub-units within programs were SUMMED for each type of sub-unit across programs.

Fourth, total personnel in all new sub-units of a particular type (e.g., small research projects) were EXTRAPOLATED to encompass all projects of that type then in progress, including projects continued from past years.

Those four steps provided a description of the number of persons (and their settings, job assignments, and R, D, and D emphases) who were being supported in the several types of sub-units by the R, D, and D funds then available to the programs included in the study. In other words, the four steps provided a "people base" to match the known funding base.

The only portion of the projection task which remained was to project the "people base" forward at a rate and pace roughly equivalent to that achieved by R, D, and D funding. After considering that remaining task, however, the project staff realized that more than a single projection of future demand for R, D, and D personnel was needed. Because of the number of variables involved, it was clear that no single projection of demand would hit the mark exactly. Yet any deviation from a single projection would have a most unfortunate consequence: the utility of the study would be reduced because (1) planners would have little assistance in deciding the range of possible endpoints for which they need prudentially to provide, and (2) the significance of any deviation would be obscure unless some boundaries were provided.

A concept was appropriated from the management planning aid called Program Evaluation and Review Technique (PERT) to provide those boundaries. The PERT concept used is that planners have less difficulty projecting with some certainty what an outcome will be if either (1) everything goes wrong, or (2) everything goes right. Their difficulty lies in projecting what, in fact, is most likely to occur; to wit, some things will go wrong but some other things will go right, leaving the outcome at some point between the extremes. Planners, then, establish their limits of reality before tackling the establishment of a most likely endpoint which is derived from the evidence available. Periodically they review the progress made, compare it to the progress projected in the most likely estimate, and adjust the endpoint upward or downward according to the new evidence at hand.

It appeared to the project staff that use of the triple-projection technique fitted perfectly their twin procedural objectives that (1) the projections provide the R, D, and D community with a planning tool which would remain viable for several years, rather than be outdated before it was printed, and (2) those who either disagreed with the way evidence was used or had evidence not available to the staff be able themselves to adjust the projections made and determine a most likely endpoint they considered more satisfactory. Consequently, it was decided to use the technique to prepare _three_ projections of personnel demand in 1974: the two which described the lower and upper boundaries of reality were termed the "Least Optimistic" and "Most Optimistic" projections, respectively, and the middle projection was termed the "Most Likely" projection.

Projections of support funds. The reader will recall the strategy for projecting personnel demand was that the number and characteristics of a body of people were to be projected forward to an extent roughly equivalent to increases in R, D, and D funding. The first question which had to be resolved was "to what should the extent of increase be compared?" A straight comparison could not be used. The availability of $200 million for R, D, and D support in FY '74 would not be a 100 percent increase over the $100 million available in FY '66 because costs associated with research, development, and diffusion activity (not to mention inflationary effects) would be increasing throughout that period. To account for the cost increases, and thereby secure a basis for comparison, a "no real gain" projection was calculated which produced an "equivalent funding base" for FY '74 comparable to the FY '66 funding base. Consequently, differences in the cost of supporting R, D, and D in FY '66 and FY '74 could be accommodated by comparing projected funding levels to the equivalent funding base rather than the FY '66 funding base.

The project staff next prepared the funding projections needed to provide a basis for the three personnel projections required. The three may be described as follows:

The Least Optimistic projection portrayed the funding level which could be expected for a program if the conditions which surrounded it were not favorable. Except when the available information indicated that a program was being reduced or phased out (e.g., the Instructional Materials Centers), it did not appear reasonable to assume that a program would (over time) fall below its current level of operation, however.[3] As a result, the Least Optimistic projection exhibited the funds needed to support a FY '68 level of operation.

A good example of the use to which the Least Optimistic projection may be put is already available. Readers who do not wish to accept the caveat to the general assumption underlying the study (i.e., that the unusually stringent funding support for FY '67-'69 will be increased during FY '70-'74) may rely on the Least Optimistic projection to furnish them a description of the situation which will exist in 1974 if funding awards are not increased beyond what is needed to maintain current levels.

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[3] As noted above, even the maintenance of a status quo program requires an annual increase in funding in order to offset increases in costs. In the "Development of Funding Projections" section of this chapter evidence is cited which indicates that costs increase at least 5 percent annually; hence that amount must be added each year.

The Most Optimistic projection depicted the anticipated funding for a program if the factors which affected it were favorable; that is, the projection reflected the level of funding which the program administrator believed could be achieved if there were such obvious public acceptance (and even demand) for the program that policy-makers, program planners, and Bureau of the Budget personnel endorsed his full budgetary request for appropriations, and the appropriations, in turn, were granted in full. It did not appear reasonable to project a higher level of funding than the program administrator believed obtainable for his program, except in the case of the national R and D center program. There it appeared likely that agency-level administrators would use the national R and D center mechanism to respond opportunistically to urgent societal needs--an action the program administrator could not be expected to include in his projection for the future.

The Most Likely projection portrayed, for each program, FY '74 funding which represented the conclusions of the project staff as the result of their logical assessment of evidence which was specified. Of the three projections it was the only one produced by the project staff; the other two were furnished either by calculation or by external estimate of program administrators. It is the projection which the reader is most likely to modify as more and better data are available.

Having established the bases for the three funding projections, the final step in the funding projection process was to provide a tool for translating projections of funding into demand for personnel. The tool used was termed the "growth ratio." It simply reported the magnitude of difference between the equivalent funding base and a funding projection endpoint. If the growth ratio were 1:1.00, for example, the funds projected were precisely equivalent to the funds which supported the personnel in the FY '66 people base; if the growth ratio were 1:1.50, not only the FY '66 population but half again as many new positions could be supported as well. Calculation of the growth ratios for three funding projections in each sub-unit type was the final preparation needed before commencing the personnel projections.

Projection of personnel positions. Baseline projections of the R, D, and D positions which could be supported in 1974 were obtained by straight calculation. The number and characteristics of the personnel in the FY '66 "people base" were projected to FY '74 to the extent indicated by the growth ratio. Thus, if the growth ratio of the Most Likely projection for the ERIC clearing houses were 1:2.00, the number of positions projected was twice the number of personnel in the FY '66 people base for the clearing houses. The number of positions in each setting, job assignment, and R, D, and D emphasis were similarly doubled. The results of these calculations were three baseline personnel projections which matched the three funding projections in the same way the people base matched the original funding base.

Adjustment of personnel projections. The projection calculations were said to have produced baseline projections at this point because personnel not supported by the agencies included in the study (e.g., institutional researchers, personnel in business and industrial organizations) had not yet been incorporated in the projections. To compensate, a logical assessment (based on the evidence available) was made of the prospective growth of these omitted groups during the decade 1964-1974. The number projected as a result of this assessment were added to the baseline projections to secure the final projections of the study.

Selection of Support Agencies and Programs

In keeping with the assumption that ESEA-affected programs would be the primary determiners of R, D, and D personnel demand during the next several years, the chief support programs selected were in the U. S. Office of Education, as follows:[4]

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[4] Both the ESEA Title I and International Education programs were included in (1) the initial data-gathering, and (2) the preliminary projections of the study reported at the 1967 Annual Meeting of AERA. The legislative mandate that Title I activities be evaluated initially suggested there could be a corps of evaluators employed in school systems. Few were discovered in the proposals examined in FY '66, but that was considered too early to make a decision on retention of the program in the study. When it later became clear that few persons were even in training for the evaluator job assignment, the decision was made to exclude Title I from the study.

The International Education program was not supported by anticipated appropriations and so was also excluded.

Bureau of Research

- Division of Elementary and Secondary Education Research
- Division of Higher Education Research
- Division of Educational Laboratories
- Division of Comprehensive and Vocational Education Research
- Division of Information Technology and Dissemination

Bureau of Elementary and Secondary Education

- Division of Plans and Supplementary Centers
- Division of State Agency Cooperation

Bureau of Education for the Handicapped

- Division of Research (formerly the Handicapped Children and Youth Program in the Bureau of Research)

A major objective of the ESEA was to secure the improvement of instruction through provision of improved course materials and more substantive course content. Consequently, it was clear that attention would be devoted to these activities by the U. S. Office of Education, but as of FY '66 the effort had hardly begun. To secure models upon which to base characterizations of future USOE course content improvement projects and programs, the Pre-College Course Content Improvement Program in the Division of Pre-College Education in Science of the National Science Foundation was also selected as a support program.

Sampling Within Programs

The primary data of the chapter were obtained from the ESEA-created and -fostered USOE programs listed in the preceding section. The data were derived from proposals in these programs which had already been approved for FY '66 funding. Each proposal selected was analyzed by a member of the project staff to determine several specific items of data (which are listed on pages 134-135).[5] Neither time nor project resources permitted examination of all proposals approved for funding in FY '66 by these programs, so a sampling strategy was prepared and followed.

The objectives of the sampling strategy were (1) to identify all of the diverse populations, and (2) to discover all of the various types of projects which existed within the programs selected. Since it could not be known in advance which populations and types of projects were unique, it was assumed all populations and every type of project in every program were unique and, consequently, all of them were to be sampled. The extent of sampling was to be determined at the time the data were being gathered, the practice followed being that the sampling of a given population or type of project would be continued until the members of the staff--and the readers of this report, eventually--were satisfied that an accurate picture had been obtained.[6]

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[5] Members of the project staff refined their data-gathering skills and increased the uniformity of their perceptions in practice sessions with sample proposals prior to the actual data-gathering in May, 1966.

Once sampling was begun, it was noticed that similar types of projects, or sub-units, were used across the divisions and branches in the Office of Education. Some used the "project" sub-unit to carry out their program, others the "center" sub-unit, and some used several different types of sub-units to achieve their objectives. The project staff examined the question of whether similar types of projects had to be sampled everywhere. In keeping with the sampling strategy, it was decided, with one exception, they did. The single type of sub-unit excepted was small grants where it was found the smallness of the funds involved required the personnel demands to be similar regardless of their objectives.[7]

In all other cases the project staff attempted to sample as close to the total population of projects as time and the data sources used would allow. The reader will notice (in Appendix B) some strange samplings (e.g., eight out of nine R and D centers) which resulted when not all proposals were available at all times. The reader will also notice that, where the number of new projects in a branch began to approach 20, the proportion of contracts sampled was reduced because (1) it became apparent little was being added to the description of the program already obtained, and (2) it was necessary to accommodate the time of the people taking the sample.

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[6] The sampling strategy employed was uniform across programs but, as indicated above, the specific sample drawn from each program was not uniform. Detailed sampling information is presented in Appendix B.

[7] The reader will note in Appendix B that, after 44 small grants had been examined, no others were sampled. The reader should also notice, however, that small grants were sampled in both a curriculum and a research branch. The staff thought there might be some difference in small grant personnel demands if the distinction between research and development were pushed, but as it turned out there was none.

As a final note, a few programs so regulated the proposals they accepted that all were the same, e.g., the Research Coordinating Units and Instructional Materials Centers. After the sampling of a few proposals confirmed that condition, no further sampling was undertaken.

Analysis of the Proposals Included in the Sample

Seven types of information were drawn from each proposal in the sample. They included:

Proposal number and proposing institution

Length of the project

Amount of the grant and portion required for staff support

Number of professional staff and their (descriptive) titles, e.g., senior psychologist

Classification of each person according to setting, job assignment, and R, D, and D functioning

Time commitment of each professional to the project

Title of the project, its objectives, and other data considered relevant by the examiner.

These data provided a detailed description of (1) the number of persons being supported by the new proposals sampled, (2) the settings in which they performed their work, (3) their job assignments, and (4) their research, development, or diffusion emphases. Where the basic objectives or methods of a program remained relatively constant after FY '66 (e.g., R and D centers), these data provided a firm basis for projecting a description of the program in the future. When the objectives and methods of a program were altered substantially (e.g., elementary and secondary curriculum), a model had to be used as the basis for projection. Personnel projections for USOE course content development projects, for example, were based on the staffing patterns of the NSF Course Content Improvement Program because USOE expected to become engaged in course content activity but had not done so in FY '66.

Interviews and Literature Analysis

Both to extend the description of each program and agency obtained through analysis of approved proposals and to improve our understanding of the existing and anticipated operation of the several programs, interviews were conducted with administrators at the agency level and below. A complete list of the persons interviewed appears in Appendix C. In terms of number, there were the following:

Office level administrators	3
Bureau level administrators	5
Division level administrators	14
Branch level administrators	17
Operating unit administrators	9
Others[8]	6

In addition to the literature itemized in the Bibliography to this report, a few internal budgetary documents were obtained and used for background information only. These have not been quoted or cited directly. They included five-year budgetary projections to FY '72 and '73,[9] and budgetary breakdowns of functions performed (e.g., research, development, evaluation) by the selected programs in FY '67 and '68.

Development of Funding Projections

Lack of a uniform base. The objective in developing projections of funding was to provide a basis for calculating the R, D, and D positions which could be supported in 1974.

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[8] Includes members of national advisory boards and administrators of operating field agencies supported by one of the selected programs.

[9] As indicated, the latest year covered in the budgetary projections available was FY '73. Since the projections which appeared in that document assumed a normal rate of growth in FY '69 and every year thereafter, and since the endpoints projected for FY '73 would not be attainable by that time if (as appears likely) a normal rate of growth is not forthcoming in FY '69, the project staff felt justified in cross-checking with some of the FY '73 projections as though they were FY '74 endpoints.

The most desirable funding base from which to develop the projections would have been expenditure data for FY '66 and '67 and appropriation data for FY '68 for all programs included in the study. Those data were not uniformly available to the project staff. It was learned there is no single source in the Office of Education for financial breakdowns of the depth required by this study (i.e., at the sub-unit level of support). Any meaningful definition of Office of Education funding, apart from distributions which match the organizational structure of USOE, had to be obtained from individual program personnel. However, the Office of Education is centralizing its financial accounting in an effort to improve its management, so program personnel did not always have the detailed data needed for this project. Consequently, the reader will see (in Appendix D), that a funding base had to be handcrafted, and that both expenditure and appropriations data were used within and across programs.

The project staff considered the consequences of not having uniform data, of course. Certainly there is some disadvantage, but the difference between appropriations and expenditures at the sub-unit level is not very great for any given program. Further, the funding data are used later in the chapter in context with several other bodies of data related to funding: the funding histories developed therefore cannot be as misleading as they might have been if the sole projection technique of the study had been an extrapolated funding curve. Finally, one of the three projections *did* spring from a common base. The Most Optimistic projection, being based on program administrator projections of funding in the years to come, sprang from the common base of reality at the time the projections were made. The staff concluded, then, that the consequences of not having a funding base as uniform as would have been preferred were not serious.

Overview of the process. Once a funding base had been developed which matched the description of people obtained, five additional steps were followed. One of the additional steps (the first one presented below) was related directly to the personnel projections to be calculated. The remaining four steps were related to the development of the three funding projections. The five steps were:

> The FY '66 *funding base was projected* to FY '74 *on a "no real gain" basis*, i.e., with adjustments made to offset annual increases in costs, in order to determine the "equivalent funding base" needed in FY '74 to support the same number of people as were supported in FY '66
>
> The *boundaries* of future funding *were developed*, and termed the Least Optimistic and Most Optimistice projections
>
> The *funds* available to each program in FY '68 *were distributed among the different types of sub-units* it employed to carry out its program
>
> The prospective *growth* of each type of sub-unit *was assessed systematically* against the evidence available
>
> The *conclusions* reached as a result of the systematic assessment of possible sub-unit growth *were presented as the Most Likely projection* of funding in FY '74.

"No real gain" projection of the funding base. Two reports in the literature suggested that R, D, and D costs were rising each year. Based on the experience of the National Science Foundation in supporting research and development, the Director of NSF, Leland J. Haworth, reported in 1965 that R, D, and D costs were rising on the order of 5 percent to 7 percent per year.[10] And a National Institutes of Health manpower study of medical researchers concluded that expenditures per professional worker in medical research increased between 1954 and 1960 in constant dollars (to exclude inflationary influences) at a compound rate of 5.3 percent per annum.[11]

With costs increasing, more money was required each year to support the same number of people. Because of that fact, the number of people supported by a known number of dollars in FY '66 could not simply be increased in exact proportion to dollar increases projected for FY '74. To have done so would have resulted in an inflated projection.

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[10] Leland J. Haworth, "Effects of Current Trends on the Support of Research," presented at a symposium conducted at the eighth annual meeting of the National Research Council, National Academy of Sciences, in Washington, D. C., and reported in The National Science Foundation: Current Trends, The Foundation: Washington, D. C., 1965, pp. 32-40.

[11] National Institutes of Health, "Manpower for Medical Research, Requirements and Resources, 1965-1970," Resources for Medical Research, Report No. 3, U. S. Department of Health, Education and Welfare, Washington, D. C., January, 1963, p. 12.

Consequently, if the FY '66 "people base" was to be projected accurately, a funding base for FY '74 was needed which was equivalent to the FY '66 funding base. The two literature reports cited above indicated that an annual increase of at least five percent per year was needed to prepare an equivalent funding base. The "no real gain" projection, then, added a numerical constant of five percent to the FY '66 funding base and to each year thereafter (to FY '74) in order to determine the equivalent funding base needed in FY '74 to support the same number of people as were supported in FY '66. The equivalent funding base provided the launch point for the projections of personnel.

Development of projection boundaries. As indicated earlier, the PERT technique appropriated featured the establishment of reasonable minimal and optimal boundaries as necessary steps toward the development of a Most Likely endpoint.

In the view of the project staff, the minimal condition which might be expected to occur was that all program growth might be restricted, but no program would experience an actual decline (unless it were part of a planned phase-out of a type of operation, of course). The "no real gain" projection just described satisfied those conditions precisely. Increases in operating costs were accommodated, so that no program would experience an actual decline, but no program expansion was included. However, to have used the "no real gain" projection as the minimal projection of future funding would have been a failure to use the best evidence available. The "no real gain" projection was based on FY '66 funding; prior to the preparation of this report data were available on FY '68 funding. The projection based on FY '66 funding, then, while essential as a base for later personnel projections, was not adequate as a base for funding projections because it failed to take into account the actual increases beyond five percent per year which had occurred during the interval FY '66-'68.

In order to use the best data available, a Least Optimistic projection of future funding was prepared for each program by adding a numerical constant of five percent per year to the FY '68 funding of the program and to the funding projected each year thereafter (to FY '74) in order to determint the amount needed to support a status quo operation of the program.

The optimal projection of future funding support was termed the Most Optimistic projection. The endpoint of this projection was obtained externally; as was indicated earlier, the projection reflected the level of funding the program administrator believed could be achieved. With one exception, discussed earlier, the project staff did not consider it reasonable to project a higher level of funding than was projected by the program administrator. Since only the base point (FY '68) and the end point (FY '74) of the Most

Optimistic projection were fixed by this procedure, the amounts projected for the intervening years were prepared by this staff. The actual amounts decided upon and inserted reflected the observations that (1) funding increases are usually in proportion to the funding base, i.e., seldom is the amount of increase determined as other than a percentage of the current appropriation, (2) increases granted for program expansion generally occur over time, growing in size from year to year, and (3) increases granted to mature programs are likely to be less volatile than those granted new or drastically re-organized programs.

Development of Most Likely projection. The influence of the project staff upon the projections to this point was clearly limited: the Least Optimistic boundary was determined by simple calculation, and the Most Optimistic boundary by external estimate. Development of a middle projection by the staff required (1) re-distribution of program funds to sub-units within programs, (2) an evidential assessment of prospective growth by each type of sub-unit, and (3) the development of conclusions which could be presented as a Most Likely projection.

The first manipulation of the data directed toward the preparation of a projection in which the project staff were involved, i.e., the Most Likely projection was to re-distribute the funds available to each program in FY '68 (the base year for the funding projections) among the different types of sub-units it employed to carry out its purposes, i.e., the regular research projects, R and D centers, laboratories or clearing houses supported as the means of accomplishing program objectives.[12] The move to a sub-unit level of analysis was made for two reasons: (1) as noted in the methodological section of Projections of Educational Statistics to 1974-75, the usual way to project complex data is to project the components and then sum them[13] and (2) differential rates of growth and development were anticipated for the various types of sub-units.

The 18 sub-unit types found in the two selected agencies and used in the study were as follows:

Programs

Centers
  R and D (4 types)
  Policy Study

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[12] Funds were not re-distributed across agency or bureau lines (with the exception of the Division of Research in the Bureau of Handicapped being melded in the Bureau of Research) because of the differing funding treatment historically accorded them. For example, the course content improvement projects in the National Science Foundation were not combined with the regular development projects of the OE Bureau of Research (even though the activities were similar) because the former program is a mature one which receives regular, moderate funding increases, while the latter program is at the front of a new and major thrust in the Bureau of Research and is therefore subject to "boom or bust" support.

[13] Simon, Kenneth A., and Fullam, Marie G., Projections of Educational Statistics to 1974-75, 1965 edition, U. S. Government Printing Office, Washington, D. C., 1965, p. 55.

- Instructional Materials
- Laboratories
- Clearing Houses
- Research Coordinating Units
- Research Divisions in State Departments of Education

Projects

- Research
  - Small
  - Regular
  - Special
- Development and Diffusion
  - Small
  - Regular
  - Special
  - ESEA Title III
- NSF Course Content Improvement

The prospective growth in funding support for each type of sub-unit was next assessed systematically against the available data. To systematize the assessment, the data assembled by the project staff were placed in five classifications: (1) boundary data, (2) funding histories, (3) comparative examiners, (4) published recommendations, and (5) informed opinions. A declining level of importance was attached to the five classifications. That is, data in the first classification were given more weight than were data in the second, third, or following classifications. The reader will be informed of the classification of data used to obtain each projection and may draw his own conclusions about the relative strength which may be assigned the projection which follows.

In the first classification were boundary data. In some cases there were factors integrally a part of a sub-unit or program which tended by their very nature to define the boundaries of possible sub-unit growth. The Research Coordinating Units, for example, could not exceed 50 in number because each state has just one. Other factors set boundaries because they possessed the ultimate authority to do so. Under the Vocational Education Act of 1963, for example, Congress stipulated that 10 percent of the funds appropriated had to be reserved for research. Until Congress modified that stipulation, it bounded the least portion of appropriations under this Act which could be allocated to research.

The funding histories of the programs or sub-units under consideration comprised the data in the second classification. The Most Likely projection for the R and D centers, for example, was based largely on (1) their past record of inaugurating new centers in clusters, and (2) the pace at which they had increased the level of support provided existing centers.

In the third classification were comparative examiners of the sub-units and programs. Here were the data from cross-checks of the projections for relatively new or undocumented sub-units with the experience records of more mature, comparable units. Two examples were the comparisons drawn between (1) the information services available to educationists through ERIC and the service NASA makes available to its space engineers, and (2) the more mature small grants program of NIMH and the USOE small grants program. Also included were internal cross-checks which interrelated the growth of all units within a larger budgetary unit. Thus, for example, the proportion of funds projected for the Division of Educational Laboratories was checked against the projections for other programs in the Bureau of Research to see how their projected proportion compared with the 40 percent of Bureau of Research funds which represents an outside limit for the Division.

Published recommendations regarding the sub-unit or program were the fourth classification. It was considered likely that many of the published recommendations in the body of data available would be implemented by program administrators, either because of the strength and influence of the recommending body or because the recommendations were from bodies which the programs had themselves commissioned to make a particular study. Two examples of the former were the (1) report of the 1965 White House Task Force which examined the administration of the Office of Education, and (2) study of the Office of Education by a House subcommittee chaired by Representative Edith Green (the "Green Committee").[14] Examples of the latter were the (1) recommendations of the Chase Committee which examined the educational laboratory and R and D center programs, and (2) study of their operation which Richard I. Miller coordinated for Title III administrators.[15] Also included in this classification were the published recommendations of the programs themselves regarding the areas to which they would assign priority, preference, or emphasis. Examples in the body of data were the Bureau of Research-wide emphasis on development and diffusion in contrast to research (particularly applied research), and the increase in "directed" research (through the use of "Requests for Proposals" and other techniques) in the Bureau of Research as a whole and in the divisions and branches of the Bureau.

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[14] *Study of the United States Office of Education*, Report of the Special Sub-Committee on Education, Committee on Education and Labor, House of Representatives, 89th Congress, Second Session, U. S. Government Printing Office, Washington, D. C., 1967, p. 777.

The fifth classification covered informed opinions of knowledgeable parties within and outside the agency. In the interview data, in particular, were data which were not official but represented the views of persons in a position to exercise influence upon the growth and development of subunits and programs, e.g., policy makers, program planners, advisory board members, and program participants. These data caused the projection for special development projects, for example, to be modified to accommodate an additional institutional development project and a demonstration project beyond that which is currently being supported.

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[15] Richard I. Miller, Catalyst for Change: A National Study of ESEA Title III (PACE), Committee Print, 90th Congress, First Session, prepared for the Sub-Committee on Education of the Committee on Labor and Public Welfare, U. S. Senate, U. S. Government Printing Office, Washington, D. C., 1967.

In each instance the systematic assessment of prospective sub-unit growth resulted in the staff reaching a conclusion about the extent of anticipated growth. This conclusion, or endpoint, was presented as the Most Likely projection of FY '74 funding for the sub-unit. The reader will find explicit in each Most Likely section the conditions upon which the Most Likely estimate was derived and can substitute another or other conditions for that estimate should he so choose.

A word of caution should be introduced before proceeding further. An effort was made to base the conclusions reached on the evidence presented rather than on the "feel" for the various programs which developed as the result of study and analysis, but the reader will recognize that the *selection* of the evidence used to support the conclusions reached *was influenced* by the totality of knowledge available to the project staff.

Projected increase beyond the equivalent funding base. Use of the "no real gain" projection produced a funding base for FY '74 equivalent to the FY '66 amount which supported the "people base" which had been developed. Once the three funding projections were completed, comparison between the equivalent funding base and each of the three projected endpoints indicated (1) the proportion of the projected amounts which would be required to support the people base, and (2) the proportion available to support additional R, D, and D positions at the higher cost levels expected in FY '74. For example, the people supported in FY '66 by $1 million would require $1,477,000 in support funds in FY '74, because of increases in costs during the interval. If the Least Optimistic projection of funding support for FY '74 were $2 million, the program clearly could support its original cadre of personnel and some additional positions as well.

The relative relationship of the equivalent funding base to a projected fudning endpoint has been termed the growth ratio. To continue with the example begun above, the $1,477,000 (which is the equivalent funding base) relates to the $2 million projected in the ratio of 1:1.35. The growth ratio indicates, then, not only could all of the positions in the original people base be supported, but slightly more than one third as many new positions could be supported, as well.

The growth ratio was determined for each sub-unit by dividing a projected funding endpoint by the equivalent funding base. Once the growth ratios had been calculated for all three funding projections for each sub-unit type, the tool for translating projected funding increases to personnel demand projections was at hand.

Summary. Once the funding base had been developed for the programs selected, a "no real gain" projection prepared an equivalent funding base for FY '74 comparable to the FY '66 funding which supported the people base, and four steps were taken to project three levels of funding (Least Optimistic, Most Optimistic, and Most Likely) to FY '74. The Least Optimistic and Most Optimistic projections were uninfluenced by the project staff, the former being a straight calculation of a five percent per year increase over the previous year's funding, and the latter being an external estimate by the program administrator. The Most Likely projection represented the conclusion reached by the project staff after systematically assessing the prospective growth of a given sub-unit, using the data obtained. To systematize the data, they were classified and ranked in the following order of strength: (1) boundary data, (2) funding histories, (3) comparative examiners, (4) published recommendations, and (5) informed opinions.

The relationship between the equivalent funding base and the endpoint of each funding projection was calculated, and the product was termed the growth ratio. The "growth ratio" was the tool used to translate projections of funding increases to personnel demand projections.

Development of Personnel Projections

The first projections of personnel demand were obtained by calculation. Three personnel projections (which grew out of the Least Optimistic, Most Optimistic, and Most Likely funding projections) provided baseline data on R, D, and D positions which could be supported in 1974 by the support programs in the study. Next, a logical assessment was made of the growth of populations not included in the baseline projections (e.g., institutional researchers), and the projections which resulted from that assessment were added to the baseline projections. The two were then combined as the final personnel projections of the study.

Baseline projections. The basic technique used to obtain baseline projections of personnel demand was to increase the number and characteristics of the people in each type of sub-unit in FY '66 (the people base) by using the multiplier indicated by the growth ratio. For example, if a growth ratio for a type of sub-unit were 1:2.00, both the number and the characteristics of the persons in the people base were doubled to obtain the baseline projections. As a result, the proportions of persons found in the several institutional settings, job assignments, and R, D, and D emphases in FY '66 would be maintained in the baseline distribution of FY '74 positions to institutional settings, job assignments, and R, D, and D emphases.

Appropriate use of that technique in the precise form stated rests on the condition that the (1) major program objectives, (2) types of sub-units employed, and (3) number and characteristics of the personnel employed in the sub-units will remain similar over time.[16] In three cases, all elements of that condition were not met and the basic technique had to be modified.

As noted earlier, the first element of that condition could not reasonably be applied to the FY '66-type of special development and diffusion projects because (as a result of passage of the ESEA) a marked change in program objectives was anticipated. Consequently, in this instance, and in the two instances following, the people base used for projection was prepared by using as models the personnel base of programs which had objectives comparable to the newly-accepted objectives.[17] Proposed activity in special development and diffusion projects was believed to resemble, in part, the course content improvement activity of NSF and, also in part, the institution-building and demonstration activities taking place in regular development and diffusion projects. Therefore, both the number and the characteristics of the positions projected for special D and D projects were derived by determining (1) the proportion one half of special D and D project funds would be of NSF-CCI funds, (2) the proportion the other half would be of regular D and D project funds, and (3) projecting both the number and the characteristics of each half in exact proportion to the number and characteristics of the people in the program upon which the half was based.

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[16] The varying duration of projects within programs caused us to make an assumption which is related to the condition, to wit: within programs, quantitative personnel requirements will remain relatively constant in spite of the termination of various projects; that is, the assumption was made that completed projects were likely to be replaced (in the aggregate) by other projects employing a similar number and type of persons in similar settings. The project staff's continuing study over a three-year period of the programs selected has not caused them to challenge the validity of this assumption.

[17] Prior to this, the reader has been advised he should (1) review the evidence used at some later point and adjust it according to later data, and (2) involve himself sufficiently to question whether he would have made the same assumptions and decisions. These three sub-units, especially, provide the reader ample opportunity to exercise himself on both points.

Projections for two other sub-units were modeled on the personnel base of comparable programs, not because of altered objectives, but because the (1) Handicapped Children and Youth (HCY) R and D centers and (2) special research projects were too new to secure even a long-distance gauge of the number and characteristics of the people employed or to be employed.

The HCY R and D centers are of two types: one type is to be funded at an optimum annual level approximating $250,000; the second type will be funded optimally at $500,000 annually. The model used to project the number of positions likely to be supported by the smaller HCY R and D centers was the R and D center at Johns Hopkins University _in its first year of operation_, when it received annual funding of $200,000. The Johns Hopkins University R and D center was used as the model for the larger type of HCY R and D centers, as well, during its _second_ year of operation, when its funding level had increased to roughly $500,000. Since the work of the HCY and Johns Hopkins University R and D centers were not comparable, a different model was used upon which to base the characteristics (i.e., settings, jobs, R, D, and D emphases) of the number of people suggested by the Johns Hopkins models. On the assumption that the work of the HCY R and D centers would most resemble regular project activity in HCY, the people in the HCY R and D centers were distributed across settings, job assignments, and R, D, and D emphases in the same proportion as persons in HCY regular projects.

Special research projects are those "basic" studies which will be coordinated by the National Research Council of the National Academy of Sciences. These were modeled on regular research projects. The number of persons to be assigned special research projects was derived by determining the proportion that anticipated special research project funds were of projected regular research project funds (4.38 percent) and assigning the same proportion of persons in the regular research project "people base" to special research projects (4.38 percent of 816 persons supported on regular research projects equaled 36 persons to be assigned to special research projects). Since special research project personnel are likely to be exclusively scholars in the disciplines, the settings for the 36 were modeled on the distribution of non-educationists in regular research projects (i.e., roughly one third in psychology, one third in other behavioral and social sciences, and one third in other discipline and academic departments, respectively).

A final deviation from the basic procedure must be mentioned before the procedures used in the development of the final personnel projections of the study are discussed. A downward adjustment was made in the calculated projections of the educational laboratories and the R and D centers in the Division of Educational Laboratories because the proportion of funds allocated to the support of positions in these major, long-term programs was expected to be reduced as the size of their annual appropriations increased.[18] The budgetary allocations of the educational laboratories already illustrate this effect. In FY '68 the 13 laboratories receiving the least funding (average $799,103) devoted 63 percent of their funds to support of personnel; the seven receiving the greatest annual support (average $1,878,475) allocated just 55 percent of their funds to personnel support--a reduction of 8 percent. The project staff worked through the rate of decline in personnel support for two of the largest educational laboratories and two mature R and D centers. As a result, the positions calculated for the overall educational laboratory program were reduced 15 percent below the Most Optimistic projection and 10 percent below the Most Likely projection. The R and D centers in the Division of Educational Laboratories were not projected to receive funding increases as large as those of the educational laboratories, so the number of positions calculated for the R and D center program were reduced just 10 percent below the Most Optimistic projection and 5 percent below the Most Likely projection.

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[18] These were the only two sub-units in which projected funding increases raised the annual budgets of individual operating units to a level where this effect would be of any real significance. Increases in other sub-units were largely attributable to the initiation of new units rather than to the expansion of existing ones (e.g., clearing houses, national centers, HCY centers).

Final projections. At this point, the personnel projections were incomplete. Educational R, D, and D personnel supported by (1) agencies other than the U. S. Office of Education and the National Science Foundation and (2) higher education institutions were not represented. The framework used for the attempt to complete the projections was that used in Table 9 in Chapter II, "Estimated Number of R, D, and D Personnel by Agency Setting and Functional Job Emphasis--1964." Much of the data were derived from the populations included in Table 9, as well.

A logical assessment was made of the extent to which (1) the populations identified in Table 9 were not represented in the baseline projections, and (2) the populations not represented in the baseline projections might grow in size. Supporting evidence was used when it was available, of course, but in most instances the staff modeled anticipated growth in unrepresented populations on projections of growth in similar populations already included in the baseline projections.

The conclusions reached with regard to the unrepresented populations were combined with the baseline projections to form the final personnel projections of the study.

Summary. The first projections of personnel demand were calculations of demand as indicated by the growth ratio, i.e., the extent of difference between projected support funds and the equivalent funding base of a sub-unit. Appropriate use of that technique required three elements to remain constant over time: (1) program objectives, (2) types of sub-units employed, and (3) number and characteristics of the personnel employed in the sub-units. Three sub-units did not meet all three elements necessary for appropriate use of the basic projection technique, so the personnel projections for the three were modeled on the people base of programs directed toward comparable objectives. The number of personnel calculated for the educational laboratory and R and D center programs of the Division of Educational Laboratories was reduced from the level indicated by the growth ratio, because the annual budgets of the operating units were projected to reach a size where they could reduce the proportion of their budgets allocated to the support of personnel.

The final projections of personnel demand were produced by combining (1) projections derived logically for populations of persons identified in 1964 but not supported by the selected U. S. Office of Education or National Science

Foundation programs with (2) the baseline projections which had been calculated.

Summary of Procedures

The strategy adopted for making projections of personnel was (1) to relate R, D, and D personnel to the funds available for these purposes, and (2) to project an increase in demand for R, D, and D personnel which was related to projected increases in R, D, and D funds. Required to carry out this strategy was (1) selection of support programs which created, or appeared likely to create, important demand for R, D, and D personnel; (2) a description of personnel supported by these programs at a given level of funding; (3) projection of the support funds to be made available to the selected programs (in this case to 1974); (4) projection of the positions which could be supported by the programs to a level equivalent to the projected level of funding; and (5) adjustment of the personnel projections to accommodate positions not supported, and consequently not accounted for, by the selected support programs.

Support programs selected. The support programs selected were (1) those created or fostered by the Elementary and Secondary Education Act of 1965 in the U. S. Office of Education, since they appeared likely to be the primary determiners of demand for R, D, and D personnel, and (2) the Course Content Improvement Program of the National

Science Foundation, since it appeared likely that some of the new activities of the USOE would develop along lines it (the NSF-CCI) had followed for several years.

Description of the personnel supported. A description of the personnel supported in these selected programs was obtained by applying the logical structure of the study to a sample of proposals the programs had approved for funding in FY '66. Included in the description of personnel for each program were (1) the number supported, (2) the settings in which they would be employed, (3) their job assignments, and (4) their R, D, and D emphases. The funding available to support these persons was obtained from program personnel, since no single source could supply funding data at the (sub-unit) level required by the study.

Projection of support funding. Since the cost of conducting research, development, and diffusion will continue to increase between FY '66 and FY '74, a "no real gain" projection was prepared which indicated the equivalent funds needed in FY '74 to support each program at the level it had achieved in FY '66.

To be useful, three projections of personnel were required, rather than one. Three projections of funding were prepared, then, to serve as bases for the personnel projections desired. Using a technique appropriated from the planning aid called Program Evaluation and Review Technique (PERT), projections were prepared at minimal, optimal, and most likely levels of attainment. These were termed Least Optimistic, Most Optimistic, and Most Likely projections. The first two were furnished, either by calculation or by external estimate of program administrators. The Most Likely projection was produced by the project staff, using the evidence available to project the future funding levels of the various types of sub-units employed by programs to carry out their activities, i.e., the projects, centers, laboratories, clearing houses, and other structural devices employed to achieve program objectives.

The three endpoints projected for each sub-unit were compared to the equivalent funding base (previously discussed) to secure a measure of the extent of difference between the two, a measure termed here as the growth ratio. The growth ratio was the tool used to translate funding projections to projections of demand for R, D, and D personnel.

Projection and adjustment of R, D, and D positions. The first (baseline) projections of personnel demand were calculations of demand as indicated by the growth ratio. Logically-derived projections of demand for populations of persons identified in the 1964 community but not yet represented here were combined with the baseline projections to secure the final personnel projections of the study.

Funding Projections

Before becoming involved in the reams of funding data in this section, the reader should remember that the projections of funding were only the instrumentalities used to project the demand for R, D, and D personnel. The funding projections need to be read if the personnel projection process is to be fully understood, but the reader more interested in the conclusions reached about personnel demand may wish to budget the time he devotes to this section.

The section is organized on the 18 types of sub-units found in the USOE and NSF programs visited. Because of the differing nature of personnel demand, the sub-units were grouped as programs and projects. (Programs involve a definite career commitment; projects may or may not.) The 18 sub-units, with a brief identifying note, are outlined below:

Programs

- Centers
  - Research and development
    1. Division of Educational Laboratories (The "R and D centers")
    2. Division of Comprehensive and Vocational Education Research (DCVR vocational educational centers at Ohio State and North Carolina universities)
    3. Division of Elementary and Secondary Education Research (DESR national center in early childhood education at University of Illinois)

4. Division of Research in Bureau of Education for the Handicapped--labeled "HCY" for Handicapped Children and Youth (the former designation of the R and D center at Teachers College, Columbia, plus nine others either forming or to be formed

5. Policy Study (at Stanford and Syracuse)

6. Instructional Materials (sub-units of Division of Research--Handicapped Bureau, presently 16 in number)

7. Educational Laboratories (20 laboratories in Division of Educational Laboratories)

8. Clearing Houses (18 sub-units of the Educational Research Information Center system)

9. Research Coordinating Units (a research stimulating/disseminating unit of the Division of Comprehensive and Vocational Research in 46 states)

10. Research Divisions of State Departments of Education (as supported by funds from Section 503 of ESEA Title V)

Projects

Research (in the Division of Research of the Bureau of Education for Handicapped, and the Divisions of Elementary and Secondary Research, Higher Education Research, and Comprehensive and Vocational Education Research in the Bureau of Research, USOE)

11. Small (projects costing $10,000 or less over 18 months or fewer)

12. Regular (conventional projects)

13. Special ("basic" research projects to be coordinated, in part, by the National Research Council of the National Academy of Sciences)

Development and Diffusion

14. Small

15. Regular

16. Special (new "institutional prototype" projects, e.g., "Educational System for the Seventies")
17. Elementary and Secondary School D and D Centers (as supported by grants under ESEA Title III)
18. Course Content Improvement (supported by Pre-College Section of the National Science Foundation)

Under most sub-units the reader will find (1) a presentation of the Least Optimistic and Most Optimistic projections, (2) presentation and discussion of evidence to support a Most Likely projection, and (3) the Most Likely projection of funding. In two instances (ESEA Titles III and V) there will be a fourth step--projections of that portion of overall funding considered likely to be devoted to R, D, and D purposes. In two other instances (Instructional Materials Centers and Research Coordinating Units) all three projections are the same, for reasons which will be explained in the respective sections.

As a final note, with the exception of special research projects (which will be funded initially in FY '69) the projections were based on appropriations data for FY '68.[19] The reader will recall that it was necessary to handcraft funding histories at the sub-unit level through (1) interveiws with division and branch personnel, (2) examination of annual reports, (3) partial breakdowns from the USOE budget offices, and (4) other means. The histories developed in this manner for FY '66-'68, and the technical notes which support them, are presented in Appendix D because of their length and complexity. An examination of the funding histories presented there will provide the reader with some perspective on the relative size and impact of the sub-units which follow immediately.

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[19] The impact of using funding data not obtained from a single source and appropriation data when expenditure data could not be secured is discussed in the "Development of Funding Projections" section (pages 136-138).

R and D Centers

R and D centers were found in the (1) Division of Educational Laboratories, (2) Division of Comprehensive and Vocational Education Research, (3) Division of Elementary and Secondary Education Research, and (4) Division of Research--Bureau of Education for the Handicapped. These are discussed separately because of their differing objectives and structures.

DEL R and D centers. The Least Optimistic and Most Optimistic projections of funding for the DEL R and D centers are as follows:

TABLE 11. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR DEL R AND D CENTERS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$ 8,100[a]	$ 8,100[a]
1969	8,505	8,505
1970	8,930	13,000
1971	9,376	19,900
1972	9,845	27,000
1973	10,337	33,800
1974	10,853	40,000

[a] Actual appropriation

The Most Likely projection anticipates the formation of 10 additional R and D centers and is based on the new centers being supported (over time) at a level which approximates a funding schedule the project staff derived from the (1) funding histories of the operational units, and (2) plans of the program administrator. The reader will therefore need to refer to those funding histories (Table 12).

TABLE 12. FUNDS ALLOCATED TO DEL R AND D CENTERS IN FY '64 AND '65 FOR PROGRAM PURPOSES, AND IN FY '66-'68 FOR ALL PURPOSES ($ IN THOUSANDS)

R and D center	Fiscal years				
	1964	1965	1966	1967	1968
Pittsburgh	$490	$ 754	$1,183[a]	$1,463	$1,465
Oregon	509	534	663[a]	676	590[a]
Wisconsin	---	500	808	1,053	1,200
Harvard	---	382	1,112	1,165	---[c]
Georgia	---	---	401[a]	761	849
Texas	---	---	459[a]	770	802
Stanford	---	---	350[a]	810	1,000
Berkeley	---	---	316[a]	849	925
CUE	---	---	1,020	---[d]	---[d]
UCLA	---	---	479[a]	534[e]	743
Johns Hopkins	---	---	---	173	516
TOTALS	$999	$2,170	$6,791	$8,254	$8,090

Source: data provided by R and D center branch personnel 1/68 and 7/68.

[a] For 10 months.

[b] Does not include an unspecified amount of unused FY '67 funds which were carried over.

[c] Withdrew from the R and D center program, effective FY '68.

[d] Became an educational laboratory in 1967.

[e] For 8 1/2 months.

Examination of Table 12 led to the preparation of a "Proposed Funding Schedule for New R and D Centers" which is presented as Table 13.

TABLE 13. PROPOSED FUNDING SCHEDULE FOR NEW R AND D CENTERS ($ IN THOUSANDS)

Year	Amount
First	$ 200
Second	500
Third	800
Fourth	1,200
Fifth	1,600
Sixth	2,000

The proposed level of first-year funding for new centers at $200,000 was based on the program administrator's statement that initial funding of new centers would be reduced. Their experience has been that leadership personnel of new centers, being without staffs and faced with a major organizational task, cannot use $400,000 to $500,000 during the initial year. The initial grant (of $173,000) to Johns Hopkins University supported that expressed intention.

Proposed second-year funding of $500,000 was supported by (1) the second-year funding of the Johns Hopkins center ($516,000), (2) the grants to Georgia, Texas, et al, in their first year under the previous funding schedule (the average grant for 12 months was $464,000), and (3) the program administrator's estimate of what second year funding would be.

The level of funding proposed for the third year was based on the average allocation of $822,815 to Georgia, Texas, et al, during their second year under the previous schedule. In other words, the five centers initiated in FY '66 jumped from initial funding of $500,000 to second year funding of $800,000. Under the proposed schedule that same jump would be maintained, but moved back one year to accommodate the new initial step of $200,000.

The sixth and final step was the only remaining one for which there was a base. The program administrator's view was that most centers would be held at a peak funding level equivalent to $1.5 million in FY '68. The equivalent of that amount in FY '74 would be $2 million, and that amount was inserted as the final step in the proposed schedule. The staff then simply averaged out the increases for the fourth and fifth years of the schedule.

Using the proposed funding schedule, the pace required to fulfill the Most Optimistic estimate of 25 operating centers and $40 million in support money by FY '74 was charted. The results are given in Table 14.

TABLE 14. INAUGURAL PACE REQUIRED TO HAVE 25 OPERATING CENTERS BEING SUPPORTED BY $40 MILLION IN FY '74, USING THE FUNDING SCHEDULE IN TABLE 13

Fiscal year	Number of centers
1968	9[a]
1969	-
1970	+9
1971	+5
1972	+2
1973	-
1974	-

[a]Existing centers.

The pace in Table 14 appeared improbable of achievement. So the data available were examined in detail, beginning with the boundary data available on sites for new centers. In Chapter IV reference is made to institutions which (1) were identified by Bargar, Buswell, or Sieber as either producers of researchers or of quality research, (2) were sites for existing R and D centers, or (3) held more than $250,000 in current project contracts with the U. S. Office of Education, other than training projects. Thirty institutions were identified. By definition, 10 of the 30 already had (or once had) an R and D center, leaving 20 as possible prime sites for an R and D center.

Not all of the 20 will ever actually be R and D center sites, however. The creation of an R and D center requires at least (1) a cadre of skilled researchers in an area of interest to the Office of Education that is not already covered by another R and D center or other major research agency, (2) a desire on the part of the skilled researchers to prepare and carry out a sustained and integrated program of research in their area, and (3) a major and long-term institutional commitment. Further, these conditions must all exist during the specific period in which the Office of Education is accepting proposals for new R and D centers. As the existing R and D centers attest, the combining of these conditions is not insuperable, but either inability or a lack of desire to meet one or more of the conditions stated above will undoubtedly disqualify some of the 20 "prime" sites from consideration. On that basis, it appeared reasonable to assume that the practical limit of sites for R and D centers would be reached with the formation of 10 new centers through FY '74.

The pace at which the 10 new centers might be initiated will undoubtedly be influenced by the arduous nature of the requesting task. Proposals for an R and D center are so complex that universities would be reluctant to make the effort if there were little likelihood of success, as there would be if just one new center were to be approved. Consequently, the Office of Education may be expected to cluster the inauguration of new centers. The following table charts the application (after FY '69) of the funding schedule in Table 13 to a bi-annual initiation of a total of 10 new centers through FY '74. The dollar totals in the table are also the Most Likely projection of funding for the R and D center program in the Division of Educational Laboratories.

TABLE 15. FISCAL IMPLICATIONS OF ESTABLISHING 10 ADDITIONAL R AND D CENTERS THROUGH FY '74, USING THE FUNDING SCHEDULE IN TABLE 13 ($ IN THOUSANDS)

Fiscal year	Number of centers at various funding levels								Total centers	Total dollars
	$200	$500	$800	$1,000	$1,200	$1,400	$1,600	$2,000		
1968	-	2	3	2	1	1	-	-	9	$ 8,000
1969	-	1	4	2	1	1	-	-	9	8,300
1970	3	-	1	-	6	-	2	-	12	11,800
1971	-	3	-	-	1	-	7	1	12	15,900
1972	3	-	3	-	-	-	1	8	15	20,600
1973	-	3	-	-	3	-	-	9	15	23,100
1974	4	-	3	-	-	-	3	9	19	26,000

DCVR R and D centers. Least Optimistic and Most Optimistic projections for the vocational education R and D centers of the Division of Comprehensive and Vocational Education Research (DCVR) appear in Table 16.

TABLE 16. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR DCVR R AND D CENTERS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	\$2,225[a]	\$2,225[a]
1969	2,336	2,336
1970	2,453	2,600
1971	2,575	2,800
1972	2,703	3,000
1973	2,838	3,200
1974	2,980	3,350

[a] Actual appropriation.

Both division and branch administrators were of the opinion that the present number of R and D centers (two) will not be increased. Branch administrators supplied the \$3.35 million estimate of maximum funding for the existing centers through FY '74, a figure that the record of the DEL R and D centers shows to be obtainable. There is not much difference between the extreme amounts, and some additional funding will be required because the programs of the two R and D centers are not currently complete. Therefore, their Most Optimistic projection was adopted as the Most Likely projection.

DESR national center. Least Optimistic and Most Optimistic projections for the national R and D center in Early Childhood Education of the Division of Elementary and Secondary Education Research (DESR)are presented in Table 17.

TABLE 17. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR THE NATIONAL R AND D CENTER ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$1,700[a]	$1,700[a]
1969	1,785	2,000
1970	1,874	2,500
1971	1,968	3,000
1972	2,066	3,150
1973	2,169	3,307
1974	2,277	3,472

[a] Actual appropriation.

According to branch personnel, no further national centers are planned. The single existing center is scheduled to reach and maintain a relative plateau at $3 million.

However, urgent social pressures in such areas as urban living, student activism, and segregation/integration appear likely to evoke a response from the Office of

Education. The national centers are flexible sub-units which could provide OE the opportunity to tap quickly into small but extant pools of expertise and talent. A rapid build-up could be achieved in the funds devoted usefully to a particular problem. For these reasons, the creation of two new national centers was projected and, consequently, the Most Likely projection exceeded the Most Optimistic projection of the program administrator.

New national R and D centers were posited in FY '71 and '73, both to follow a funding schedule similar to the actual and projected schedule of the existing Early Childhood Education center. The result is presented in Table 18. The total support funds indicated are also the Most Likely projection for the national R and D center program.

TABLE 18. MOST LIKELY PROJECTION OF FUNDING FOR EXISTING AND POSTULATED NATIONAL R AND D CENTERS ($ IN THOUSANDS)

Fiscal year	Projected Funding Support			Total support funds
	Existing center	Additional center "A"	Additional center "B"	
1968	$1,700[a]	--	--	$1,700
1969	2,000	--	--	2,000
1970	2,500	--	--	2,500
1971	3,000	$1,500	--	4,500
1972	3,150	2,000	--	5,150
1973	3,307	2,500	$1,500	7,307
1974	3,472	3,000	2,000	8,472

[a] Actual appropriation.

HCY R and D centers. The Least Optimistic projection of funding for the Division of Research, Bureau of Education for the Handicapped (i.e., the former Handicapped Children and Youth program) R and D centers assumed continued funding for the single existing center. The Most Optimistic projection was based on the creation of one additional larger center (i.e., $500,000 annual budget) and the changeover of eight instructional materials centers to smaller R and D centers (i.e., $350,000 annual budget) at a pace suggested by division personnel.

TABLE 19. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR HCY R AND D CENTERS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$ 470[a]	$ 470[a]
1969	494	485
1970	519	1,500
1971	545	3,000
1972	572	3,750
1973	601	4,250
1974	631	5,000

[a] Actual appropriation

Division personnel expected to establish 10 R and D centers in all, but of a smaller size than the centers supported by other divisions. The maximum size of the majority of centers was expected to approximate $350,000.

Since the new centers were being formed out of extant organizations, the likelihood of the division's being able to accomplish much of what it projects were increased. The Most Likely projection was based on the initiation of all 10 centers. By using an initiation and changeover schedule suggested by division personnel, the rate of growth depicted in Table 20 was prepared. The dollar totals are also the Most Likely projection of funding for the HCY R and D center program.

TABLE 20. POSSIBLE RATE OF GROWTH OF HCY R AND D CENTERS ($ IN THOUSANDS)

Fiscal year	Number of centers at various funding levels								Total centers	Total dollars
	$250	$300	$350	$400	$450	$500	$550	$600		
1968	-	-	-	-	1	-	-	-	1	$ 470[a]
1969	-	-	-	-	1	-	-	-	1	494
1970	4	-	-	-	-	1	-	-	5	1,500
1971	4	4	-	-	-	1	-	-	9	2,700
1972	1	3	4	1	-	-	1	-	10	3,500
1973	-	3	4	1	1	-	1	-	10	3,700
1974	-	2	4	1	1	1	-	1	10	3,950

[a] Actual appropriation.

Policy Study Centers

Least Optimistic and Most Optimistic projections of funding for the two policy study centers are as follows:

TABLE 21. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR POLICY STUDY CENTERS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$1,000[a]	$1,000[a]
1969	1,050	1,050
1970	1,102	1,500
1971	1,157	2,000
1972	1,215	2,250
1973	1,275	2,375
1974	1,339	2,500

[a] Actual appropriation.

The opinions of informed bureau personnel were in agreement that the policy study centers were expected to grow to require approximately twice the FY '68 level of funding and to be held at that relative point. The growth history of the original DEL R and D centers confirms the ready possibility of that magnitude of growth. The original centers exceeded their initial budget estimates by two and even three times. On that basis, and since more comparable models were lacking, the Most Optimistic projection was accepted as the Most Likely projection, as well.

Instructional Materials Centers

Division plans for the materials centers were for (1) a reduction in the number of centers from 16 to eight, and (2) continuation of present support levels for the centers which remained. Because of these conditions, all three funding projections are the same. The single funding projection for this sub-unit, depicted below, used a reduction schedule for IMC's which matched the inauguration schedule of HCY R and D centers. Long-term programatic grants (7-10 years) were to be used to convert eight of the former to the latter (and then support them). Annual increases of 5 percent per year were calculated for the IMC's which remained operational in any given year.

TABLE 22. PROJECTED NUMBER OF, AND FUNDING SUPPORT FOR, INSTRUCTIONAL MATERIALS CENTERS ($ IN THOUSANDS)

Fiscal year	Projected	
	Number of centers	Funding support
1968	16[a]	$2,800[b]
1969	16	2,940
1970	12	2,315[c]
1971	8	1,621[d]
1972	8	1,702
1973	8	1,787
1974	8	1,876

[a] Actual number.

[b] Adjusted figure equals 16 IMC's times average cost of $175,000. Federal funding is for varying periods so full support of the IMC program was not represented in actual FY '68 appropriations of $2,751,000.

[c] Equals 12 centers at average cost (after two increases of five percent per year) of $192,937.

[d] Equals eight centers at average cost of $202,584.

Educational Laboratories

The Least Optimistic and Most Optimistic projections of funding for the educational laboratories are given in Table 23.

TABLE 23. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR THE EDUCATIONAL LABORATORIES ($ IN THOUSANDS)

Fiscal year	Projection	
	Least optimistic	Most optimistic
1968	$23,800[a]	$23,800[a]
1969	24,990	25,000
1970	26,240	30,000
1971	27,552	39,000
1972	28,930	52,500
1973	30,376	70,000
1974	31,895	90,000

[a] Actual appropriation

The Most Likely projection grew out of three factors: First, continuation of the present 20 laboratories was assumed. Since the current laboratories cover the country, this appeared to be a kind of "boundary" datum which indicated there would not be more than 20. The published recommendation of the Chase Committee (appointed by the Office of Education to review the laboratory program) that the laboratories not be reduced in number, in spite of organizational and staffing problems, indicated there would not be fewer than 20 laboratories, either.[20]

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[20] National Advisory Committee on Educational Laboratories, Statement adopted May 12, 1967, mimeo, p. 5.

Second, every administrator of the laboratory program has affirmed a funding goal of between $4 million and $5 million annually per laboratory. Since some laboratories continued to make substantial progress toward that goal, even during "tight money" years, it appeared likely some would reach an annual support level of $4.5 million or more by FY '74.

Third, the laboratories were currently funded differentially, and, according to Hendrik D. Gideonse in the Office of Program Planning of the Bureau of Research, the stronger ones would continue to be granted a disproportionate share of Bureau of Research funds.[21] If that were the case, the distance between the highest- and lowest-supported laboratories would further lengthen.

Since not all laboratories could achieve annual funding of $4.5 million, as the Most Optimistic projection assumes, it was clear that the Most Likely projection must fall short of that mark. Table 24 gives a tabular presentation of the rate of funding progress that the project staff considered reasonable in the light of the objectives and funding plans cited above.[22] The Most Likely projection for the educational laboratories, depicted in Table 25, was prepared by summing the midpoints of each level of support for FY '74

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[21] Educational Researcher, no. 4, 1968, p. 2.

[22] Implicit in the presentation is the belief of the project staff that the laboratory program is maturing, and is less likely as a result to enjoy massive spurts in support.

(i.e., three laboratories at $1.25 million, three at $1.75 million, and so forth).

TABLE 24. POSSIBLE DISTRIBUTION OF EDUCATIONAL LABORATORIES ACCORDING TO LEVEL OF FUNDING SUPPORT

	Number of laboratories at various levels of support[a]										
Fiscal year	-- to $0.5	$0.5 to $1.0	$1.0 to $1.5	$1.5 to $2.0	$2.0 to $2.5	$2.5 to $3.0	$3.0 to $3.5	$3.5 to $4.0	$4.0 to $4.5	$4.5 plus	Total number
1966	11	8	-	-	-	-	-	-	-	-	19
1967	5	9	3	2	-	1	-	-	-	-	20
1968	-	12	3	2	2	1	-	-	-	-	20
1969	-	12	3	2	2	1	-	-	-	-	20
1970	-	9	3	3	2	2	1	-	-	-	20
1971	-	6	6	1	2	2	2	1	-	-	20
1972	-	3	6	3	1	2	2	2	1	-	20
1973	-	-	6	4	3	1	1	2	2	1	20
1974	-	-	3	3	4	3	1	1	2	3	20

[a] Dollars in millions

TABLE 25. MOST LIKELY PROJECTION OF FUNDING FOR EDUCATIONAL LABORATORIES ($ IN MILLIONS)

Fiscal year	Projection
1968	$23.8[a]
1969	$23.5
1970	$29.0
1971	$34.0
1972	$41.0
1973	$48.0
1974	$56.0

[a] Actual appropriation

Clearing Houses

Least Optimistic and Most Optimistic projections for the ERIC clearing houses appear below.

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TABLE 26. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF THE NUMBER AND FUNDING SUPPORT OF ERIC CLEARING HOUSES ($ IN THOUSANDS)

Fiscal year	Projections			
	Least Optimistic		Most Optimistic	
	Number	Funding support	Number	Funding support
1968	18[a]	$2,700[b]	18[a]	$2,700[b]
1969	19	2,993	19	3,000
1970	19	3,142	22	3,900
1971	19	3,299	24	4,800
1972	19	3,464	24	5,600
1973	19	3,637	24	6,500
1974	19	3,819	24	7,500

[a] Actual number.

[b] Adjusted amount equal to 18 clearing houses times average cost of $150,000. Federal funding is for varying periods so full support of clearing house program is not represented in actual FY '68 appropriation of $2,172,000.

A comparative examiner was available for consideration in determining the Most Likely projection. According to the program administrator, the National Aeronautics and Space Administration expended $5.1 billion, of which $28 million was allocated to the provision of information services to scientists and engineers. U. S. Office of Education expenditures that year were $4.7 billion, but information services to research, development, diffusion, and practitioner personnel in education were supported by just $3.5 million.

That datum tended to support the logical conclusion that the Most Likely projection should resemble the Most Optimistic projection, since the clearing houses form part of an information preparation, storage, retrieval, and dissemination system; that is, they are part of an inter-related series of units, all of which are required to produce the capability desired. It was assumed the decision to build the ERIC system countenanced support of all components essential to the operation of that system.

Insertion of the annual amounts which would lead to an approximation of the Most Optimistic projection depended upon the number of clearing houses projected for each year. The preliminary conclusions of a study commissioned by the ERIC program of the "domains" of education indicated an eventual need for 24 clearing houses. With the thought that clearing houses added to reach that figure would be added quickly, in order to complete the system, three new clearing houses were scheduled for FY '70 and the remaining two in FY '71 (the nineteenth clearing house was to be initiated in FY '69). Each new clearing house was calculated to receive initial support of $150,000, the average support for clearing houses to date.

It was subsequently determined that the decisions (1) to have the Most Likely projection approximate the Most Optimistic projection, and (2) to project the establishment of

24 clearing houses at the pace described above could be implemented by adoption of an annual rate of increase (after FY '69) of 15 percent for the clearing houses. The result of using 15 percent as an annual multiplier is presented in Table 27.

TABLE 27. MOST LIKELY PROJECTION OF NUMBER OF AND FUNDING SUPPORT FOR ERIC CLEARING HOUSES ($ IN THOUSANDS)

Fiscal year	Projection	
	Number of clearing houses	Funding support
1968	18[a]	$2,700[b]
1969	19	2,985[c]
1970	22	3,883[d]
1971	24	4,765[e]
1972	24	5,480
1973	24	6,302
1974	24	7,247

[a] Actual number.

[b] Adjusted amount, as described in footnote to previous table.

[c] Derived from five percent increase on FY '68 amount plus $150,000 for an additional clearing house.

[d] Derived from five percent increase on FY '69 amount plus $450,000 for three additional clearing houses.

[e] Derived from five percent increase on FY '70 amount plus $300,000 for two additional clearing houses.

Research Coordinating Units

Beginning in FY '69 and thereafter, each RCU was to be supported by an annual grant of $50,000 from the U. S. Office of Education, that sum to be matched by state funds. The annual grant was to remain fixed at that level, not be adjusted to compensate for increases in costs. Consequently, the endpoints of the three funding projections were the same. Federal support for the RCU's, then, was projected as follows:

FY '68--	$2,760,000 (46 RCU's times average cost of $60,000)
FY '69-- and thereafter	$2,450,000 (49 RCU's times annual fixed grant of $50,000)

The maximum number of RCU's was expected to be 49, since three states were forming an RCU consortium (making 48 for the states) and Puerto Rico was to be included as the site of the forty-ninth RCU.

Research Divisions of State Departments of Education (ESEA Title V)

ESEA Title V furnishes funds to support improvement activities of state departments of education under Sections 505 and 503. Funds awarded under the former section are for the support of the activities of combinations of state departments, and those under the latter section are for the support of activities of individual state departments. Proposals supported under both sections were analyzed in FY '66, but only two of 14 Section 505 proposals were at all related to research, development, or diffusion in education--and these two employed few R, D, or D personnel. As a result, the decision was made not to include Sec. 505 funds in the projections for Title V. Later events weakened any adverse consequences of that decision, as the funds reserved for the support of activities under Section 505 were reduced from 15 percent to five percent of Title V funds appropriated.

Least Optimistic and Most optimistic projections of overall funding under Section 503 of ESEA Title V, then, are as given in Table 28.[23]

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[23] The projections of overall funding will be followed by projections of R, D, and D funding, since most Sec. 503 funds were not used to support R, D, and D personnel.

TABLE 28. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF OVERALL FUNDING FOR ESEA TITLE V ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$25,287[a]	$25,287[a]
1969	26,551	33,500
1970	27,878	44,400
1971	29,272	59,000
1972	30,736	78,000
1973	32,273	100,000
1974	33,887	125,000

[a] Actual appropriation

In a related development, the 1968 amendments to the ESEA changed the locus of administration of ESEA Title III from the Office of Education to state departments of education. The change was to occur over a two-year period, with the states controlling up to 75 percent of the FY '69 allocations and all of their FY '70 allocations. By FY '70, as a result, the states were to assume the additional responsibility of administering perhaps $500 million in Title III monies; by FY '74, perhaps $1.5 billion!

To date, the history of funds appropriated for Sec. 503 has been as follows:

FY '66--$14,450,000

FY '67--$17,645,000 (+29 percent)

FY '68--$25,287,000 (+35 percent)

On the assumption that the added responsibility of administration of Title III would encourage continuation of the average annual increase of 32.5 percent, the Most Likely projection of overall funding was based on continuation of that average annual increase through FY '72. The annual increase for FY '73 and '74 was reduced to five percent per year to match the leveling which occurs in the last two authorizations for Sec. 503.[24] The resulting projection is as given in Table 29.

TABLE 29. MOST LIKELY PROJECTION OF OVERALL FUNDING FOR ESEA TITLE V, SECTION 503 ($ IN THOUSANDS)

Fiscal year	Projected overall funding
1968	$25,287[a]
1969	33,505
1970	44,394
1971	58,822
1972	77,939
1973	81,835
1974	85,926

[a] Actual appropriation.

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[24] Sec. 503 authorizations from FY '66 through '70 were and are: $14,450,000; $17,645,000; $65,000,000; $80,000,000; and $80,000,000.

Most Title V funds were used for other than R, D, or D purposes, however. The proportion of Sec. 503 funds allocated to study, planning, evaluation, and research functions approximated 19 percent during FY '66 and '67.[25] The allocation of state department funds prior to 1966, however, was four percent of the total expenditures.[26]

When the program administrator was asked about this apparent change in the value assigned study, planning, evaluation, and research functions, he cautioned that state departments have frequently used these funds to "shore up" emergency gaps created by the pressures of other federal programs. In other words (but not the administrators' words), funds in this category have frequently been treated as contingency funds.

Without additional data, the proportion of funds actually devoted to study, planning, evaluation, and research could not be determined by the project staff. However, the increase, from four percent to 19 percent, of funds allocated to planning and research purposes was viewed as being unusual. Consequently, the project staff attached sufficient weight to the administrators' observation to lower the proportion regarded as being actually devoted to planning and research to a point slightly below the midpoint between 19 percent and four percent, i.e., to 10 percent of Sec. 503 funds.

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[25] The proportion of Sec. 503 funds used for study, planning, evaluation, and research functions in both FY '66 and '67 was reported to be 18.8 percent, in Focus on the Future: Education in the States, Third Annual Report of the Advisory Council on State Departments of Education, Appendixes B and C, U. S. Office of Education, Washington, D. C., pp. 96-99.

[26] Focus on the Future, ibid., Appendixes D and E, pp. 100-103.

Using 10 percent as the proportion of available funds which would be devoted to R, D, and D purposes, the following Least Optimistic projection of R, D, and D funds was computed:

TABLE 30. LEAST OPTIMISTIC PROJECTION OF R, D, AND D FUNDS AVAILABLE UNDER ESEA TITLE V, SECTION 503 ($ IN THOUSANDS)

Fiscal year	Projected R, D, and D funds
1968	$2,528[a]
1969	2,655
1970	2,788
1971	2,927
1972	3,074
1973	3,227
1974	3,389

[a] Ten percent of actual appropriations.

Use of the 10 percent figure did not appear appropriate for calculation of the Most Likely and Most Optimistic projections of R, D, and D funding, however, because the growth of the Most Likely and Most Optimistic projections of overall funding, unlike the Least Optimistic projection of overall funding, was predicated primarily upon additional funds being made available to administer ESEA Title III, rather than for the support of a variety of purposes including the strengthening of study, planning, evaluation, and research capability. The latter functions would be used to some greater extent because of the assumption of responsibility for Title III administration (e.g., preparation of state plans, development of classifications of innovation, evaluation of Title III projects), of course, but the bulk of the additional funds would likely be used for management and processing purposes. It appeared unlikely that the proportion of funds devoted to planning and research would remain constant when the purpose of the increase in funds was to support functions other than planning and research.

As a result, the method used to calculate the Most Likely and Most Optimistic projections of R, D, and D funding was to reduce the proportion of overall funds available under Sec. 503 of Title V from 10 percent in FY '68 to the traditional four percent by FY '74, at the rate of one percent per year (i.e., nine percent in FY '69, eight percent in FY '70, etc.). The projections which resulted are presented in Table 31.

TABLE 31. MOST LIKELY AND MOST OPTIMISTIC PROJECTIONS OF R, D, AND D FUNDS AVAILABLE UNDER ESEA TITLE V, SECTION 503 ($ IN THOUSANDS)

Fiscal year	Projection	
	Most Likely	Most Optimistic
1968	$2,528[a]	$2,528[a]
1969	3,015	3,015
1970	3,552	3,552
1971	4,117	4,130
1972	4,676	4,680
1973	4,092	5,000
1974	3,437	5,000

[a] Ten percent of actual appropriations.

Small Research Projects

Table 32 presents the Least Optimistic and Most Optimistic estimates of funding for small research projects in FY '74.

TABLE 32. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR SMALL RESEARCH PROJECTS

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$1,518[a]	$1,518[a]
1969	1,594	2,250
1970	1,674	3,000
1971	1,759	3,850
1972	1,847	5,000
1973	1,939	6,200
1974	2,035	7,500

[a] Actual appropriation.

The small grant program of the National Institute for Mental Health provides a comparative examiner to help in arriving at a Most Likely projection. The funding history of the NIMH small grant program has been as shown in Table 33.

TABLE 33. FUNDING HISTORY OF SMALL GRANT PROGRAM OF THE NATIONAL INSTITUTE FOR MENTAL HEALTH ($ IN THOUSANDS)

Fiscal year	Support funds	Percent of change from previous year
1957	$217	
1958	195	- 10
1959	258	+ 32
1960	276	+ 7
1961	365	+ 32
1962	861	+136
1963	922	+ 7
1964	869	- 6
1965	731	- 16
1966	900	+ 23
1967	852	- 5

Source: Personnel in NIMH Division of Research Grants (7/68).

The substantial increase from FY '61 to FY '62 was excluded from consideration because it was not related to a comparable event in the U. S. Office of Education. That is, the increase resulted from an increase in the maximum amount which could be funded under the small grant program, from $2,000 to $3,500; the U. S. Office of Education small grants staff have discussed raising their small grant ceiling from $10,000 to $15,000 or even higher at some point in the future, but that possibility was then only at the discussion stage.

From FY '57 through FY '61, the program received an average increase in funds of 15 percent. From FY '62 through FY '67, the funding increase averaged less than one percent per year. The "average" figures did not adequately portray the up-and-down pattern of funding, but they did indicate (1) a maximum average annual increase of 15 percent, and (2) a reduction in the average annual increase as the base sum became larger.

The recent funding history of the U. S. Office of Education small research grants program has been as follows:

FY '66--$1,671,000
FY '67--$1,671,000
FY '68--$1,518,000

The recent funding history was one of decline. However, that was apparently the result of the extremely tight funding situation in the Bureau of Research as a whole. Since reasonable increases were being projected for the Bureau over the next several years--and an end to the unusually stringent fiscal years--it was assumed that the small research grants program would share in those reasonable increases. The least it could grow and maintain relative position would be the five percent per year presented as the Least Optimistic projection.

At the other extreme, the sum of money involved in the U. S. Office of Education small grants program was larger than that involved in the NIHM program, so an average annual increase of 15 percent appeared to be more than a reasonable rate of increase.

It was reasoned the small grant program did provide the Bureau of Research a desirable vehicle for (1) conducting small basic studies, (2) training prospective researchers, and (3) enabling small and underdeveloped institutions to carry on a research program of sorts. The small grants program did not then cover the three areas adequately. On those bases, annual increases midway between five percent and 15 percent (i.e., 10 percent) were arbitrarily established for calculation of the Most Likely projection. If the upper limit of $10,000 for small grants were raised at some point in the future, the reader should recognize that a substantial one-year increase (on the order of 100 percent) would result and should adjust the projection accordingly.

TABLE 34. MOST LIKELY PROJECTION OF FUNDING FOR SMALL RESEARCH PROJECTS ($ IN THOUSANDS)

Fiscal year	Projected funding
1968	$1,518[a]
1969	1,669
1970	1,837
1971	2,020
1972	2,222
1973	2,444
1974	2,689

[a] Actual appropriation.

Regular Research Projects

Least Optimistic and Most Optimistic projections for research projects exceeding 18 months duration and/or $10,000 in costs, but not a part of the new thrust of the Bureau of Research in basic research, are presented in Table 35.

TABLE 35. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR REGULAR RESEARCH PROJECTS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$22,338[a]	$22,338[a]
1969	23,455	23,500
1970	24,628	26,000
1971	25,859	29,500
1972	27,152	33,000
1973	28,510	36,500
1974	29,936	40,000

[a] Actual appropriation.

The funding history of the National Institutes of Health research grant program, depicted in Table 36, provided a comparative examiner to help in developing the Most Likely projection.

TABLE 36. FUNDING HISTORY OF THE RESEARCH GRANT PROGRAM OF THE NATIONAL INSTITUTES OF HEALTH ($ IN THOUSANDS)

Fiscal year	Support funds	Percent of change from previous year
1960	$198,719	
1961	273,941	+37
1962	373,176	+36
1963	430,908	+15
1964	497,894	+16
1965	538,867	+ 8
1966	600,973	+12

Source: Annual report of Public Health Service as it appears in the U. S. Department of Health, Education and Welfare _Annual Report_.

After four years of growth at a rate of 36 percent or better (FY '58-'60, not shown on the table, plus the period FY '60-'62), the program dropped to a lower plateau of support. During FY '63 through FY '66, the average annual increase was 12 percent.

Regular research project support in the U. S. Office of Education has declined during the past three years, as follows:

FY '66--$22,810,000

FY '67--$17,227,000

FY '68--$22,338,000

Two factors could account for the decline; (1) the tight money situation throughout the Bureau of Research, and (2) the number and magnitude of other activities being initiated by the Bureau during a period in which money was tight, e.g., educational laboratories, clearing houses. The recent funding record of the research grant program in the National Institutes of Health indicated that once the general tight money constraint was eased, the Bureau of Research program might reasonably be expected to grow at an average annual rate of about 12 percent.

However, it appeared to the project staff that an annual rate of increase of 12 percent for regular research projects in the Bureau of Research was too high, because the milieu surrounding project research in the Bureau of Research has not been positive recently. The former Associate Commissioner for Research, R. Louis Bright, and the Bureau's Director of Program Planning and Development, Hendrik D. Gideonse, have stated: "We are increasingly persuaded, for example, that prudent management of the limited resources available at the present time makes it necessary for us to adopt a research strategy that relates applied research projects closely to identified development efforts."[27] It should also be noted that the FY '69 budget request for regular project support remained at the current level, while the requests for small and basic project support were increased.[28]

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[27] Bright, R. Louis, and Gideonse, Hendrik D., "Research, Development, and Dissemination Strategies in Improving Education," in Edgar L. Morphet and Charles O. Ryan, eds., Planning and Effecting Needed Changes in Education, Designing Education for the Future, Denver, Colorado, 1967, p. 103.

Not only has Bureau of Research emphasis been placed elsewhere (on development), but, at times, that emphasis has been pursued _at the expense of project research_. For example, the funds used initially to support the teacher education demonstration project in the Division of Elementary and Secondary Education Research were drawn from funds allocated to regular research project support.[29]

As a consequence, the computation of the Most Likely projection of funding for regular research projects was based on an annual increase (after FY '69) of 10 percent, rather than on the 12 percent indicated by the NIH funding record. (In view of developments, members of the project staff considered even 10 percent to be an optimistic Most Likely projection.) Table 37 presents the results of that computation.

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[28] _Educational Researcher_, _op. cit_.

[29] _Educational Researcher_, no. 1, 1968, p. 6.

TABLE 37. MOST LIKELY PROJECTION OF FUNDING FOR REGULAR RESEARCH PROJECTS ($ IN THOUSANDS)

Fiscal year	Projected funding
1968	$22,338[a]
1969	22,338
1970	24,572
1971	27,029
1972	29,732
1973	32,705
1974	35,975

[a] Actual appropriation.

Special Research Projects

This heading was set up by the project staff specifically to accommodate the new basic research projects, some of which are to be administered by the National Research Council of the National Academy of Sciences. The projects are to be directed by scholars in the disciplines. The Least Optimistic and Most Optimistic projections for this program are given in Table 38.

TABLE 38. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR SPECIAL RESEARCH PROJECTS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	--	--
1969	$1,000	$2,000
1970	1,050	3,600
1971	1,103	5,200
1972	1,158	6,800
1973	1,216	8,400
1974	1,277	10,000

The Least Optimistic estimate for FY '69 was based on the formal announcement of the U. S. Office of Education that the National Academy of Sciences had been awarded up to $1 million for use for basic research grants having Bureau of Research approval.[30] The $2 million scheduled in FY '69 for the Most Optimistic projection reflected the FY '69 request of the Bureau.[31]

Lacking any better models in education, the research grant program of the NIH again was used as a comparative examiner. The reader will recall that increases in NIH project support averaged 12 percent per year. That rate of increase was accepted as the rate at which funds would most likely be made available for special research projects.

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[30] Educational Researcher, no. 2, 1968, p. 2.

[31] Educational Researcher, op. cit., where it is stated, "Bright wants to spend nearly $2 million on a variety of basic research programs (e.g., biochemistry and psychopharmacology), about $1 million of which is to be administered in cooperation with the National Research Council."

The base (funding) point for special research projects had yet to be established at the time this report was prepared, however. As indicated earlier, an agreement had been announced between the U. S. Office of Education and the National Research Council involving $1 million for basic research, but at that time the FY '69 budget request (which contained a $2 million item for basic research) had not been passed by Congress. To establish a base point, the project staff reasoned: (1) the announcement of $1 million being made available for basic research was made before the fate of the line item supporting this activity was known, so the $1 million was apparently a measure of the minimal program in basic research which the Bureau of Research was willing to support, because they were willing to take that amount from the support of other activities if the entire $2 million requested were eliminated, and (2) given reasonable access to additional funds, the Bureau of Research apparently would like to provide more than that minimal $1 million for the support of basic research. The project staff therefore selected $1.5 million as a basepoint which might reasonably be attained.

The Most Likely projection of funding for special research projects, then, began from a FY '69 base of $1.5

million and was increased at the rate of 12 percent per year to obtain the result depicted in Table 39.

TABLE 39. MOST LIKELY PROJECTION OF FUNDING FOR SPECIAL RESEARCH PROJECTS ($ IN THOUSANDS)

Fiscal year	Projected funding
1968	--
1969	$1,500
1970	1,680
1971	1,882
1972	2,108
1973	2,361
1974	2,644

Small Development and Diffusion Projects

Table 40 presents the Least Optimistic and Most Optimistic projections of funding for small development and diffusion projects.

TABLE 40. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR SMALL DEVELOPMENT AND DIFFUSION PROJECTS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$590[a]	$590[a]
1969	620	750
1970	651	1,000
1971	684	1,125
1972	718	1,625
1973	754	2,125
1974	792	2,500

[a] Actual appropriation

In the past, schools of education have used their resources for service to school districts or to support the conduct of (individual) research. Graduate assistants did what their professors did, e.g., worked on school surveys.

The future of this program is largely dependent upon the extent to which schools of education begin working in the area of development. If development is viewed as a bona fide activity, opportunities for major project and dissertation activity should be open to the body of professors and graduate students in education. In the absence of knowledge of the outcome, the Most Likely projection used the same base as was employed with the small research projects, i.e., an average annual increase of 10 percent, as depicted in Table 41.

TABLE 41. MOST LIKELY PROJECTION OF FUNDING FOR SMALL DEVELOPMENT AND DIFFUSION PROJECTS ($ IN THOUSANDS)

Fiscal year	Projected funding
1968	$590[a]
1969	649
1970	714
1971	785
1972	863
1973	949
1974	1,044

[a] Actual appropriation.

Regular Development and Diffusion Projects

The Least Optimistic and Most Optimistic projections of funding for regular D and D projects appear in Table 42. Regular development projects in the Office of Education to this time typically involved the development of materials for all or part of a course or sequence of courses. It was anticipated that the scope of activity would be broadened to include the invention of solutions to operating problems and the packaging of those solutions in preparation for wide dissemination.

TABLE 42. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR REGULAR DEVELOPMENT AND DIFFUSION PROJECTS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$7,619[a]	$7,619[a]
1969	8,000	8,762
1970	8,400	10,076
1971	8,820	11,587
1972	9,261	13,500
1973	9,724	16,500
1974	10,210	20,000

[a] Actual appropriation.

The development activities being supported by the U. S. Office of Education were so altered in the recent past that previous USOE funding of regular development projects had little bearing on current needs. The Green Committee, for example, noted that "support of ($200,000 to $300,000 curriculum development projects) will be discontinued on the basis that such projects have little if any impact outside of the district or area in which they are undertaken."[32] Two projects which were of the newer type favored in the Bureau of Research were a $3.6 million project to develop materials for a high school physics course and a $1.6 million contract to develop and evaluate a science curriculum for grades 7, 8, and 9.[33]

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[32] *Study of the U. S. Office of Education*, *op. cit.*, p. 214.

Course and curriculum development projects of the latter type have been carried on since 1956 by the National Science Foundation. The funding history of the Course Content Improvement section of NSF (presented in Table 43) was examined, therefore, as a model of future funding for regular development projects in the U. S. Office of Education

TABLE 43. FUNDING HISTORY OF PRE-COLLEGE COURSE CONTENT IMPROVEMENT ACTIVITY IN THE NATIONAL SCIENCE FOUNDATION ($ IN THOUSANDS)

Fiscal year	Support funds	Percent of change from previous year
1959	$6,030	--
1960	6,299	+ 4
1961	6,410	+ 2
1962	8,989	+40
1963	12,632	+41
1964	13,975	+11
1965	14,551	+ 4
1966	15,563	+ 6

Sources: 1959-64, The National Science Foundation: A General Review of Its First Fifteen Years, U. S. Government Printing Office, Washington, D. C., 1966, p. 150. 1965-66, Fifteenth Annual Report and Sixteenth Annual Report of the National Science Foundation, respectively.

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[33] Ibid.

The average annual rate of increase for the NSF-CCI program was 15 percent, but the rate of increase in funding support was erratic. The 15 percent rate of increase was adopted for the Most Likely projection of funding for regular development and diffusion projects, but, in view of the erratic fluctuations in the NSF program, the reader should expect wide variations in the percent of increase from year to year.

TABLE 44. MOST LIKELY PROJECTION OF FUNDING FOR REGULAR DEVELOPMENT AND DIFFUSION PROJECTS ($ IN THOUSANDS)

Fiscal year	Projected funding
1968	$ 7,619[a]
1969	8,762
1970	10,076
1971	11,587
1972	13,325
1973	15,324
1974	17,625

[a] Actual appropriation.

Special Development and Diffusion Projects

Bright and Gideonse defined this category in a paper they presented in October, 1967, when they noted the conclusion of an OE task force that "*the smallest aggregate of instructional variables that seemed to make sense in terms of attempting significant departures in educational innovation might very well be an entire school*."[34] One of the recommendations of the task force, therefore, was that the scale of individual research and development program efforts be raised to encompass *entire institutions*. Projects relating to the development or re-building of institutions, rather than courses or curricula, were included in this category.

The funding patterns of current and planned institutional development projects differed somewhat from the pattern of the one current demonstration project, so the former were treated apart from the latter project.

Special development projects. The Least Optimistic and Most Optimistic projections for projects which had a predominant development focus are as given in Table 45.

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[34] Bright, R. Louis, and Gideonse, Hendrik D., "Education Research and Its Relation to Policy," a paper presented at the October, 1967, meeting of the Committee for Scientific and Technical Personnel, O.E.C.D., mim., p. 36. Underlining appeared in the original.

TABLE 45. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR SPECIAL D AND D PROJECTS WITH A PREDOMINANT DEVELOPMENT FOCUS ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$2,800[a]	$2,800[a]
1969	2,940	4,000
1970	3,087	7,500
1971	3,241	12,500
1972	3,404	18,500
1973	3,573	26,000
1974	3,752	35,000

[a] Actual appropriation.

One development effort of the appropriate order of magnitude was being attempted in the bureau: "Educational System for the Seventies" (ES-70). This was an effort to establish terminal behavioral objectives for the secondary school and to create a curriculum and support system to meet the objectives specified. The cost of the program was expected to amount to $35 million over the next five years.

One million dollars was requested in FY '69 to begin an institutional development effort of a similar nature for rural schools,[35] but the five-year level of support more nearly approximated $15 million than $35 million.

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[35] Educational Researcher, no. 4, op. cit.

As might be expected, each of these major institutional development efforts appeared to require a period of planning, followed by a year or two of design studies, and then the beginning of actual development work. In Table 46, which follows, that schedule is presented for the ES-70 and rural school projects. Based on the opinions of administrators interviewed, provision was made for funds to support the initiation of an additional ES-70-like project in FY '71 (e.g., in elementary schools) and an additional rural school-like project beginning in FY '73. The distribution of funds across the years represents a distribution of $35 million or $15 million over the five-year period FY '70 through FY '74, beginning at a lower level of support and building to a higher level, as is typical.

TABLE 46. SPECIAL DEVELOPMENT PROJECT FUNDS ALLOCATED IN FY '68 AND A HYPOTHETICAL DISTRIBUTION OF PROJECTS AND FUNDS, FY '69-'74 ($ IN THOUSANDS)

Fiscal year	Projected funds				Total dollars
	ES-70 project	ES-70-like project	Rural school project	Rural school-like project	
1968	$2,800	--	--	--	$ 2,800
1969	3,000	--	$1,000	--	4,000
1970	4,000	--	2,000	--	6,000
1971	5,500	$1,000	2,500	--	9,000
1972	7,000	2,700	3,000	--	12,700
1973	8,500	4,000	3,500	$1,000	17,000
1974	10,000	5,500	4,000	2,000	21,500

The dollar totals are the Most Likely projections of funding for special development projects during the years FY '69-'74 as well.

Special demonstration project. The demonstration project mentioned earlier was the teacher education program for elementary and preschool teachers. Other demonstration projects have been discussed by USOE personnel. For example, some consideration was given to establishing a demonstration school to provide a (1) setting for in-house R and D projects in curriculum, and/or (2) national exemplar of educational excellence. Support for these other projects is not now anticipated, however.

The cost of the teacher education project has been evolving. In 1967, Bright and Gideonse set the cost of designing a totally new teacher preparation program at $20 million to $40 million over a period of five to seven years.[36] More recently, however, Bright quoted an "eventual" support figure of $20 million for this project.[37]

Since the Least Optimistic projection to FY '74 totaled more than the $20 million overall support figure cited by Bright, and no other demonstration projects were being advanced, the Least Optimistic projection was at once the Most Likely and Most Optimistic projections, as well.

TABLE 47. PROJECTION OF FUNDING FOR A SPECIAL DEMONSTRATION PROJECT ($ IN THOUSANDS)

Fiscal year	Projected funding
1968	$2,700[a]
1969	2,835
1970	2,977
1971	3,126
1972	3,282
1973	3,446
1974	3,618

[a] Actual appropriation.

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[36] Bright and Gideonse, O.E.C.D. paper, _op. cit._, p. 37.

[37] _Educational Researcher_, no. 1, _op. cit._, p. 6.

The teacher education project was the only major U. S. Office of Education effort (outside of the ERIC system) in the area of diffusion. That condition certainly will not prevail over the next six years. There is much more to diffusion than this peculiar kind of demonstration, and time will see the other elements (e.g., demonstration to provide opportunity for evidential assessment, training, installation) being worked upon. This is another projection the reader will need to reconsider, both in terms of the number of personnel required and the kinds of activities being supported.

Combined projection for special development and diffusion projects. The combined projections for the special development projects and the special demonstration project are depicted in Table 48.

TABLE 48. COMBINED PROJECTIONS OF FUNDING FOR SPECIAL DEVELOPMENT AND DIFFUSION PROJECTS ($ IN THOUSANDS)

Fiscal year	Projections of funding		
	Least Optimistic	Most Likely	Most Optimistic
1968	$5,500[a]	$5,500[a]	$5,500[a]
1969	5,775	6,835	6,835
1970	6,064	8,977	10,477
1971	6,367	12,126	15,626
1972	6,686	15,982	21,782
1973	7,019	20,446	29,446
1974	7,370	25,118	38,618

[a] Actual appropriation.

Elementary and Secondary School D and D Centers (ESEA Title III)

Least Optimistic and Most Optimistic projections for Title III (in its entirety) appear in Table 49. At the time the program administrator made his estimate of future funding he was aware of the change in administration of Title III and, presumably, took that into account.

TABLE 49. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR ESEA TITLE III ($ IN MILLIONS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	\$209[a]	\$209[a]
1969	219	219
1970	230	375
1971	242	500
1972	254	800
1973	267	1,100
1974	280	1,500

[a] Actual appropriation.

As reported earlier, in FY '66-'68 the U. S. Office of Education approved direct requests from local education agencies. The 1968 amendments to ESEA altered that provision so that each state department of education will administer up to 75 percent of its Title III funds in FY '69 and all of its Title III funds in FY '70. As a result of this change, it was assumed Title III would take on many of the characteristics of ESEA Title I, and so Title I was used as a model for projecting likely support for Title III. Table 50 compares the authorizations and appropriations for the two titles to date.

TABLE 50. AUTHORIZATIONS AND APPROPRIATIONS FOR ESEA TITLES I AND III ($ IN MILLIONS)

Fiscal year	Title I			Title III		
	Authorization	Appropriation	Percent Appropriated	Authorization	Appropriation	Percent Appropriated
1966	$ 984	$ 959	97%	$100	$ 75	75%
1967	1,300	1,053	81	180	135	75
1968	2,563	1,900	74	500	208	42
1969	2,776[a]	--	--	512	--	--
1970	2,912[a]	--	--	550	--	--

Source: Data supplied by bureau personnel (5/66, 8/67, and 7/68). References to the data may also be found in *Study of the U. S. Office of Education*, *op. cit.*, pp. 244 *et seq.* and *Theory into Practice*, VI, 3, June, 1967, p. 107. Reference to the revised authorizations of Title III may be found in *Elementary and Secondary Education Amendments of 1967*, House of Representatives Report no. 1049, 90th Congress, 1st Session, p. 7.

[a] Includes $50 million in incentive grants which are used for the same purposes as other Title I funds.

Title I had consistently received a larger proportion of its authorization than had Title III. The Most Likely projection assumed Title III would begin to receive a comparable share of its authorization, as follows:

TABLE 51. MOST LIKELY PROJECTION OF FUNDING FOR ESEA TITLE III ($ IN MILLIONS)

Fiscal year	Projected funding
1968	$209[a]
1969	219
1970	375
1971	500
1972	512
1973	550
1974	577

[a] Actual appropriation.

The FY '70 projection was based on Title III receiving 75 percent of its FY '68 authorization (Title I received 74 percent of its FY '68 authorization). The FY '71 projection assumed Title III would receive 100 percent of its FY '68 authorization. FY '72 and '73 projections equaled 100 percent of the subsequent authorizations. The FY '74 projection was increased five percent, or about the same average increase as the FY '69 and '70 authorizations.

Projections of funding for the entire Title III program bore a very small relationship to the funds available for R, D, and D purposes, however. Program administrators have estimated that up to 60 percent of Title III funds are used for development and diffusion.[38] By the definitions of this project, few of the funds are used for these purposes. An analysis of the descriptions of 1,145 Title III projects, discussed in detail in Chapter IV, found about 33 percent of the projects possibly engaging in R, D, or D activities as defined by this project. A questionnaire regarding their staff was sent to these centers. The responses received indicated that, for the most part, the persons employed were providing an expected special, library, or health service, and not developing or conducting the demonstration of an innovation. That is, most personnel were simply operators of regular "special service" programs. Only eight percent of the 579 professionals employed in 137 centers ostensibly employed in educational R, D, and D were, in fact, employed to perform R, D, or D functions. And most of the eight percent were merely demonstrating quality facets of the regular school program. That result led to the conclusion that no more than eight percent of Title III funds were likely being used to support R, D, and D activities as defined by this project.

With the locus of administration of the Title III program shifting to the state departments, it appeared likely that a still smaller portion of the funds would be devoted to R, D, or D in the future. The state departments were so understaffed as to make it difficult for them to carry out much more than a distributive function. On the assumption that the stimulatory/leadership function of state departments would not initially be effective, the portion of Title III funds devoted to R, D, or D during FY '69 and thereafter was arbitrarily lowered to six percent, except that, for FY '72-'74 in the Most Optimistic projection, where the volume of funds was so great and the task for state departments so overwhelming, it appeared reasonable to lower the proportion of funds devoted to R, D, and D still further--to four percent of the total, as described in Table 52.

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[38] Bright, R. Louis, and Gideonse, Hendrik D., in "Research, Development and Dissemination Strategies in Improving Education" (op. cit., pp. 92 and 100), report this percentage as the proportion of FY '66 Title III funds which was devoted to development and demonstration.

TABLE 52. PROJECTION OF ESEA TITLE III FUNDS AVAILABLE FOR R, D, AND D SUPPORT ($ IN MILLIONS)

	Projections of funding		
Fiscal year	Least Optimistic	Most Likely	Most Optimistic
1969	$13.1	$13.1	$13.1
1970	13.8	22.5	22.5
1971	14.5	30.0	30.0
1972	15.2	30.7	32.0
1973	16.0	33.0	44.0
1974	16.8	34.6	60.0

Course Content Improvement Projects (NSF)

Least Optimistic and Most Optimistic projections of funding for the pre-college course content improvement projects of the National Science Foundation are shown in Table 53.

TABLE 53. LEAST OPTIMISTIC AND MOST OPTIMISTIC PROJECTIONS OF FUNDING FOR PRE-COLLEGE COURSE CONTENT IMPROVEMENT PROJECTS, NATIONAL SCIENCE FOUNDATION ($ IN THOUSANDS)

Fiscal year	Projection	
	Least Optimistic	Most Optimistic
1968	$13,500[a]	$13,500[a]
1969	14,175	14,175
1970	14,884	15,000
1971	15,628	16,000
1972	16,409	18,000
1973	17,229	20,500
1974	18,090	23,500

[a] Actual appropriation.

The funding history of the pre-college CCI program has been rather stable. The funds allocated in recent years were:

FY '66--$10,390,000

FY '67--$11,687,000 (+12.5 percent)

FY '68--$13,500,000 (+15.5 percent)

The Most Likely projection (after FY '69) carried through the average 14 percent annual increase of the last three years. The resulting projection is presented in Table 54.

TABLE 54. MOST LIKELY PROJECTION OF FUNDING FOR PRE-COLLEGE COURSE CONTENT IMPROVEMENT PROJECTS, NATIONAL SCIENCE FOUNDATION ($ IN THOUSANDS)

Fiscal year	Projected funding
1968	$13,500[a]
1969	13,500
1970	14,850
1971	16,335
1972	17,969
1973	19,766
1974	21,743

[a] Actual appropriation.

Growth Ratio to be Used for Personnel Projection

The reader will recall that the tool used to translate funding projections into the three projections of personnel desired was the growth ratio. The growth ratio measured the extent of difference between each projected endpoint and the equivalent funding base of a sub-unit, i.e., a funding base for FY '74 equivalent to the amount which supported the FY '66 personnel base.

Table 55 draws together the (1) funding base, (2) equivalent funding base, (3) projected endpoints, and (4) the growth ratios for each sub-unit. The "funding bases" listed in column 1 are FY '66 amounts unless otherwise indicated.[39] Increasing the funding base amounts by five percent per year (to offset increases in costs) produced the equivalent funding bases listed in column 2. Columns 3, 4, and 5 depict the endpoints projected for the 18 sub-units. The last three columns (6, 7, and 8) itemize the growth ratios obtained for each sub-unit type by dividing each of the projected endpoints by the equivalent funding base. Each growth ratio, in turn, was used as a multiplier to project the number and characteristics of the persons employed in FY '66 to a baseline projection of personnel demand for FY '74.

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[39] A detailed explanation of the data source(s) for each base amount is presented in Appendix D.

TABLE 55. FUNDING BASE, EQUIVALENT FUNDING BASE, PROJECTED FUNDING ENDPOINTS, AND GROWTH RATIOS, BY SUB-UNITS ($ IN THOUSANDS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Funding projection endpoints			Growth ratios		
Sub-Units	Funding base	Equivalent funding base	Least Optimistic	Most Likely	Most Optimistic	Least Optim.	Most Likely	Most Optim.
Programs								
Centers								
Div. Ed. Labs.	$ 6,791	$ 10,033	$ 10,853	$ 26,000	$ 40,000	1.08	2.59	3.99
Voc. Ed.	1,000	1,477	2,980	3,350	3,350	2.02	2.27	2.27
National	1,700[a]	2,277	2,277	8,472	3,472	1.00	3.72	1.52
Handicapped Ch.	470[a]	631	631	3,950	5,000	1.00	6.26	7.92
Policy Study	1,000[a]	1,339	1,339	2,500	2,500	1.00	1.87	1.87
Instruc. Mats.	1,000	1,477	1,876	1,876	1,876	1.27	1.27	1.27
Laboratories	8,025	11,856	31,895	56,000	90,000	2.69	4.72	7.59
Clearing Hses.	1,541	2,277	3,819	7,247	7,500	1.67	3.18	3.29
Res. Coord. U.	2,152	3,179	2,450	2,450	2,450	.77	.77	.77
State Depts.	1,125[b]	1,508	3,389	3,437	5,000	2.25	2.28	3.32
Projects								
Research								
Small	1,671	2,469	2,035	2,689	7,500	.82	1.09	3.04
Regular	22,810	33,686	29,936	35,975	40,000	.89	1.07	1.19
Special	1,000[c]	1,277	1,277	2,644	10,000	1.00	2.07	7.83
D and D								
Small	651	962	792	1,044	2,500	.82	1.09	2.60
Regular	13,397	19,793	10,210	17,625	20,000	.52	.89	1.01
Special	5,500[a]	7,370	7,370	25,118	38,618	1.00	3.41	5.24
Title III	6,000[d]	8,865	16,800	34,600	60,000	1.90	3.90	6.77

TABLE 55. (Continued)

Sub-Units	(1) Funding base	(2) Equivalent funding base	(3) Funding projection endpoints Least Optimistic	(4) Most Likely	(5) Most Optimistic	(6) Growth ratios Least Optim.	(7) Most Likely	(8) Most Optim.
NSF-CCI	$10,390	$ 15,350	$ 18,090	$ 21,743	$ 23,500	1.18	1.42	1.53
TOTALS	$86,223	$125,826	$148,019	$256,720	$363,266	----	----	----

[a] FY '68 base used because sub-unit did not exist in FY '66.

[b] Ten percent of section 503 funds, the proportion that the project staff estimated was devoted to R, D, and D.

[c] The minimum funding for the sub-unit, beginning in FY '69.

[d] Eight percent of Title III funds, the proportion that the project staff estimated was devoted to R, D, and D after surveying a group of Title III centers, as reported in Chapter IV.

In the aggregate, the growth ratios indicated that the baseline demand for personnel in FY '74, as compared with the personnel supported in FY '66, would be 1:1.18 under the Least Optimistic projection, 1:2.04 under the Most Likely projection, and 1:2.89 under the Most Optimistic projection.

In terms of sheer growth, according to the Most Likely projection the most expansive sub-units would be the (1) HCY R and D centers (which represented as much a restructuring of program as an expansion of program), (2) educational laboratories, (3) Title III centers, (4) national laboratories, (5) special development and diffusion projects, and (6) ERIC clearing houses. The least expansive sub-units were projected as (1) research coordinating units (a special case since state matching funds are to be forthcoming), (2) regular D and D projects, (3) regular research projects, (4) small research projects, and (5) small D and D projects.

Since funds have been tight for two or three years, it may be of interest to examine the projected situation, should funds remain tight. Only the educational laboratories and vocational education R and D centers would grow significantly. The sub-units most adversely affected would be regular D and D projects, the RCU's (again, a special case), and small and regular R, D and D projects.

A characterization of the situation depicted might be as follows:

Development and diffusion programs and projects are to be given greatest support

If funds remain tight, the support given development and diffusion will be at the expense of research projects

Programs are to be supported beyond projects

Since the more expansive programs are in new settings (laboratories, public schools) and directed toward new objectives (special D and D projects, clearing houses), the near future will be a period of turbulent organizational and role change

ESEA--created and --fostered programs will be leading the press for organizational and role change.

Summary

Three projections of FY '74 funding (i.e., Least Optimistic, Most Likely, and Most Optimistic) were prepared for 18 sub-units to serve as bases for the three projections of personnel desired. Each of the three endpoints projected was compared with an equivalent funding base to measure the extent of difference between each projected endpoint and the amount needed to support the personnel in the FY '66 people base. The result was termed the "growth ratio."

In the aggregate, the growth ratios indicated the Least Optimistic projection of personnel to FY '74 (after increases in costs and inflationary effects were accommodated) would be 1:1.18; the Most Likely projection 1:2.04; and the Most Optimistic projection 1:2.89 in relation to FY '66 personnel.

In terms of sheer growth, according to the Most Likely projection the most expansive sub-units would be (1) HCY R and D centers (which represented as much a re-structuring of program as an expansion of program), (2) educational laboratories, (3) Title III centers, (4) national laboratories, (5) special development and diffusion projects, and (6) ERIC clearing houses. The least expansive sub-units were projected as (1) research coordinating units (a special case since state matching funds are to be forthcoming), (2) regular D and D projects, (3) regular research projects, (4) small research projects, and (5) small D and D projects.

Should funds remain tight, only the educational laboratories and vocational education R and D centers would grow significantly. The sub-units most adversely affected would be regular D and D projects, the RCU's (again, a special case), and small and regular R, D, and D projects.

Personnel Projections

The reader will find reported here two projections: (1) baseline projections of personnel supported by the USOE and NSF programs included in the study, and (2) final projections which combine (a) logically-derived projections of growth in populations of R, D, and D personnel not yet represented with (b) the baseline projections The baseline projections were obviously (and intentionally) incomplete. For example, since very little involvement of personnel from business and industrial organizations was found in FY '66, the same low level of involvement was projected to FY '74. In the meantime, however, commercial and publishing companies assembled huge capital resources to support their entry into "the learning market." These admittedly incomplete projections were prepared so the project staff, and the reader, could keep separate the sources of data. The project staff obtained one body of empirical data from the proposal analysis and from interviewing which was used for the baseline projections. A second body of data was obtained from logical analysis (the 1964 description of the R, D, and D community) and literature review. These latter data were then used to build upon the more empirically-based, but incomplete, baseline projections.

In the section which treats the baseline projections, the reader will find reported (1) the base number and percent of persons extrapolated (by sub-units) from a sample of proposals approved for funding in FY '66 by the programs included in the study (unless otherwise indicated), and (2) the baseline projections which resulted from multiplication of the base number by the growth ratio. These data are reported by (1) institutional setting, (2) professional assignment, and (3) functional emphasis in the process of R, D, and D.

In the section which treats the final projections, a logical assessment is made of the prospective growth of populations not yet represented in the projections, and the projected populations which result are combined with the baseline projections to form the final projections of personnel in the study. The results are briefly summarized in a third section.

Baseline Projections of Personnel Demand

Institutional settings. The number and percent of R, D, and D personnel employed in the various sub-units (during FY '66 unless otherwise indicated) appear in Table 56. The total number (4,264) is so similar to the 4,125 persons identified in the 1964 community (see Table 9) that the reader may confuse the two. The population enumerated in Table 56 is but a portion, albeit a major portion, of the population represented in Table 9. The major reason for the apparent similarity of the two populations is that the initial impact of the ESEA was beginning to show, even before any projections were undertaken. For example:

> Twenty-nine percent (1,242) of the R, D, and D persons were employed in four ESEA-created and -fostered sub-units: DEL R and D centers, educational laboratories, state department research divisions supported by Title V, and Title III centers.
>
> The proportion of persons (29 percent) employed in these four settings was the same as that of persons working in schools and colleges of education was of the 1964 community. Schools and colleges of education were clearly the outstanding setting for R, D, and D personnel in 1964.
>
> The number employed in these four settings (1,242) as a direct result of passage of the ESEA exceeded the number in any single setting in 1964 and the combined population of seven of the 12 settings listed.

> Schools and colleges of education employed 29 percent of the persons in the total 1964 community but 40 percent of the baseline population; the setting was clearly central to implementation of the new ESEA thrusts.

Projected growth and change in institutional settings is presented in Tables 57 to 59. Again, the effects of the ESEA are clear:

> The number of positions (4,228 under the Most Likely projection) available in the four ESEA-created and -fostered settings cited above exceeds the 4,125 identified in the entire educational R, D, and D community in 1964.
>
> The educational laboratories and local public elementary and secondary school systems (under the Most Likely projection) either double or nearly double the proportion of the total R, D, and D positions they have available, thereby becoming two of the three major settings for R, D, and D. The largest setting is "Schools and Colleges of Education."
>
> A greater number of positions are projected (under the Most Likely projection) in both the educational laboratories (1,210) and the public schools (1,911) than there were in schools and colleges of education in 1964.

TABLE 56. BASE NUMBER AND PERCENT OF R, D, AND D PERSONS EMPLOYED IN VARIOUS INSTITUTIONAL SETTINGS, BY SUB-UNITS

Institutional settings	Programs										Projects									
	U. S. Office of Education																	NSF		
	Centers										Research			Development and Diffusion						
	R and D																			
	DEL	DCVR	DESR	HCY	Policy study	Instructional materials	Educ'l labs.	ERIC clearing houses	Res. coord. units	State dept. res. divs.	Small	Regular	Special	Small	Regular	Special	Title III	Pre-Coll. course content improvement	Total	Percent
Schools and Colleges of Education	334	39	56	12	3	32		64	57		208	319		64	369	77		70	1,704	40
Schools and Depts. of Psychology				3				7			34	114	12	3	27	9		26	235	6
Other Behavioral and Social Science Depts.				4	5						29	192	12	8	53	9			312	7
Other Discipline and Academic Depts.				1				3			41	105	12	6	43	58		235	504	12
College and University Administration Units											5	6			2				13	> 1
State Departments of Education						20		5	170	144		8			11				358	8
Other State Agencies												14							14	> 1
Local Public Elem. and Secondary School Systs														9	18	5	479		511	12
Other Schools and School Systems												3							3	> 1
Private Research Institutes					11							42							53	1
Private Social Service and Welfare Agencies						16						10							26	1
Professional Education Associations								5											5	> 1
Related Professional, Public and Lay Assns.								14				3				40		183	240	6
Educational Laboratories							285												285	7
TOTAL	334	39	56[a]	20	19[b]	68	285[c]	98	227	144	317	816	36[d]	90	523	198	479	514	4,263	--
PERCENT	8	1	1	> 1	> 1	2	7	2	5	3	7	19	1	2	12	5	11	12	--	100

[a] Number in FY '68 according to the center administrator (7/68).

[b] Number as of 9/18/68 according to personnel in the two policy centers.

[c] Number as of 6/67 according to project survey of lab budgets.

[d] Estimated number to be supported in FY '69; discussed under "Development of Personnel Projections."

TABLE 57. NUMBER AND PERCENT OF R, D AND D POSITIONS IN VARIOUS INSTITUTIONAL SETTINGS UNDER LEAST OPTIMISTIC PROJECTION OF FUNDING IN FY

Institutional settings	Programs										Projects									
	U. S. Office of Education																	NSF		
	Centers										Research			Development and Diffusion				Pre-Coll. course content improve-ment		
	R and D				Policy study	Instruc-tional materials	Educ'l labs.	ERIC clear-ing houses	Res. coord. units	State dept. res. divs.										
	DEL	DCVR	DESR	HCY							Small	Regular	Special	Small	Regular	Special	Title III		Total	Percent
Schools and Colleges of Education	360	78	56	12	3	41		107	44		170	285		52	192	77		83	1,560	30
Schools and Depts. of Psychology				3				12			28	101	12	2	14	9		31	212	4
Other Behavioral and Social Science Depts.				4	5						24	172	12	7	28	9			261	5
Other Discipline and Academic Depts.				1				5			34	93	12	5	22	58		277	507	10
College and University Administration Units											4	5			1				10	> 1
State Departments of Education						25		8	131	324		7			6				501	10
Other State Agencies												12							12	> 1
Local Public Elem. and Secondary School Systs														7	9	5	910		931	18
Other Schools and School Systems												3							3	> 1
Private Research Institutes					11							37							48	1
Private Social Service and Welfare Agencies						20						9							29	1
Professional Education Associations								8											8	> 1
Related Professional, Public and Lay Assns.								23				3				40		216	282	6
Educational Laboratories							767												767	15
TOTAL	360	78	56	20	19	86	767	163	175	324	260	727	36	73	272	198	910	607	5,131	—
PERCENT	7	2	1	> 1	> 1	2	15	3	3	6	5	14	1	1	5	4	18	12	—	100

TABLE 58. NUMBER AND PERCENT OF R, D, AND D POSITIONS IN VARIOUS INSTITUTIONAL SETTINGS UNDER MOST LIKELY PROJECTION OF FUNDING IN FY '74, BY SUB-UNITS

Institutional settings	Programs										Projects									
	U. S. Office of Education																	NSF		
	Centers						Educ'l labs.	ERIC clear-ing houses	Res. coord. units	State dept. res. divs.	Research			Development and Diffusion				Pre-Coll. course content improve-ment	Total	Percent
	R and D				Policy study	Instruc-tional materials														
	DEL	DCVR	DESR	HCY							Small	Regular	Special	Small	Regular	Special	Title III			
Schools and Colleges of Education	822[a]	89	208	75	6	41		204	44		226	342		70	328	262		99	2,816	33
Schools and Depts. of Psychology				19				22			37	122	25	3	24	31		37	324	4
Other Behavioral and Social Science Depts.				25	9						32	206	25	9	47	31			384	5
Other Discipline and Academic Depts.				6				10			45	112	25	7	38	198		334	775	9
College and University Administration Units											5	6			2				13	> 1
State Departments of Education						25		16	131	328		9			10				519	6
Other State Agencies												15							15	> 1
Local Public Elem. and Secondary School Systs														10	16	17	1,868		1,911	22
Other Schools and School Systems												3							3	> 1
Private Research Institutes					21							45							66	1
Private Social Service and Welfare Agencies						20						11							31	> 1
Professional Education Associations								16											16	> 1
Related Professional, Public and Lay Assns.								44				3				136		260	443	5
Educational Laboratories							1,210[b]												1,210	14
TOTAL	822[a]	89	208	125	36	86	1,210[b]	312	175	328	345	874	75	99	465	675	1,868	730	8,522	--
PERCENT	10	1	2	1	> 1	1	14	4	2	4	4	10	1	1	5	8	22	9	--	99

---

[a] Reduced 5 percent, the reader will recall, to compensate for operating units devoting a smaller proportion of their annual budgets to personnel support as the size of their annual budget increases (discussed under "Development of Personnel Projections").

[b] Reduced 10 percent for same reason as preceding footnote.

TABLE 59. NUMBER AND PERCENT OF R, D AND D POSITIONS IN VARIOUS INSTITUTIONAL SETTINGS UNDER MOST OPTIMISTIC PROJECTION OF FUNDING IN FY '74, BY SUB-UNITS

Institutional settings	Programs										Projects									
	U. S. Office of Education																	NSF		
	Centers						Educ'l labs.	ERIC clear-ing houses	Res. coord. units	State dept. res. divs.	Research			Development and Diffusion				Pre-Coll. course content improve-ment		
	R and D				Policy study	Instruc-tional materials														
	DEL	DCVR	DESR	HCY							Small	Regular	Special	Small	Regular	Special	Title III		Total	Percent
Schools and Colleges of Education	1200	89	85	95	6	41		211	44		632	379		166	373	403		107	3,831	31
Schools and Depts. of Psychology				24				23			103	136	94	8	27	47		40	502	4
Other Behavioral and Social Science Depts.				32	9						88	227	94	21	54	47			572	5
Other Discipline and Academic Depts.				8				10			125	125	94	16	43	304		359	1,084	9
College and University Administration Units											15	7			2				24	> 1
State Departments of Education						25		16	131	478		10			11				671	5
Other State Agencies												17							17	> 1
Local Public Elem. and Secondary School Systs.														23	18	26	3,243		3,310	27
Other Schools and School Systems												4							4	> 1
Private Research Institutes					21							50							71	1
Private Social Service and Welfare Agencies						20						12							32	> 1
Professional Education Associations								16											16	> 1
Related Professional, Public and Lay Assns.								46				4				210		280	540	4
Educational Laboratories							1,699												1,699	14
TOTAL	1200[a]	89	85	159	36	86	1,699[b]	322	175	478	963	971	282	234	528	1,037	3,243	786	12,373	--
PERCENT	10	1	1	1	> 1	1	14	3	1	4	8	8	2	2	4	8	26	6	--	100

---

[a] Reduced 10 percent to compensate for smaller proportion of funds being used to support personnel as the budgets of the individual operating units increase in size (discussed under "Development of Personnel Projections").

[b] Reduced 15 percent for same reason as in preceding footnote.

Professional assignment. The number and percent of persons employed in various professional assignments (in FY '66 unless otherwise indicated) are reported in Table 60, by sub-units. Project directors and staff, not identifiable in 1964, constitute 69 percent of the total in Table 60. The career patterns of more than 600 persons were altered in a new direction as they became employed in an educational laboratory or DEL R and D center.

The projected number and percent of positions available in various professional assignments in FY '74 are reported in Tables 61 to 63. Comparison of the Most Likely projection with the 1964 description (Table 9) indicated:

> The proportion serving as program directors and staff remains about the same (38 percent), but the number of career positions available more than doubles (to 3,304 from 1,594). The educational laboratories will support approximately one third of the total number of program director and staff positions.
>
> The number of project director and staff positions available (5,168) in this partial projection will be more than double the number of non-program persons identified in the entire R, D, and D community in 1964.

TABLE 60. BASE NUMBER AND PERCENT OF PERSONS EMPLOYED IN VARIOUS PROFESSIONAL ASSIGNMENTS, BU SUB-UNITS[a]

Sub-Units	Director/Staff, outside-funded R, D and D programs	Director/Staff R, D and D projects	Stimulators and coordinators	Director/Staff, R, D and D training programs	Total
PROGRAMS					
Centers					
DEL	334				334
DCVR	39				39
DESR	45[a]		11[a]		56[a]
HCY	20[b]				20[b]
Policy Study	19[b]				19[b]
Instructional Materials	68				68
Laboratories	285[c]				285[c]
Clearing Houses.	98				98
Research Coord. Units	227				227
State Dept. Res. Divs.	122		22		144
PROJECTS					
Research					
Small		317			317
Regular		816			816
Special		36[b]			36[b]
D and D					
Small		90			90
Regular		475	18	30	523
Special		198[b]			198[b]
Title III		479			479
NSF-CCI		514			514
TOTAL	1,257	2,925	51	30	4,263
PERCENT	29	69	1	1	100

[a] Number obtained (7/68) from Director of national center. There are 11 stimulators and coordinators listed because of the need for each of the cooperating centers to have a coordinator on their staff.

[b] Based on FY '68 or 1968 data.

[c] Based on project analysis of lab budgets, 6/67.

TABLE 61. NUMBER AND PERCENT OF R, D AND D PROFESSIONAL POSITIONS UNDER LEAST OPTIMISTIC PROJECTION OF FUNDING IN FY '74, BY SUB-UNITS

Sub-Units	Director/Staff, outside-funded R, D and D programs	Director/Staff R, D and D projects	Stimulators and coordinators	Director/Staff, R, D and D training programs	Total
PROGRAMS					
Centers					
DEL	360				360
DCVR	78				78
DESR	45		11		56
HCY	20				20
Policy Study	19				19
Instructional Materials	86				86
Laboratories	767				767
Clearing Houses	163				163
Research Coord. Units	175				175
State Dept. Res. Divs.	275		49		324
PROJECTS					
Research					
Small		260			260
Regular		727			727
Special		36			36
D and D					
Small		73			73
Regular		247	9	16	272
Special		198			198
Title III		910			910
NSF-CCI		607			607
TOTAL	1,988	3,058	69	16	5,131
PERCENT	39	60	1	> 1	100

TABLE 62. NUMBER AND PERCENT OF R, D AND D PROFESSIONAL POSITIONS UNDER MOST LIKELY PROJECTION OF FUNDING IN FY '74, BY SUB-UNITS

Sub-Units	Director/Staff, outside-funded R, D and D programs	Director/Staff R, D and D projects	Stimulators and coordinators	Director/Staff, R, D and D training programs	Total
PROGRAMS					
Centers					
DEL	822[a]				822[a]
DCVR	89				89
DESR	167		41		208
HCY	125				125
Policy Study	36				36
Instructional Materials	86				86
Laboratories	1,210[b]				1,210[b]
Clearing Houses	312				312
Research Coord. Units	175				175
State Dept. Res. Divs.	278		50		328
PROJECTS					
Research					
Small		345			345
Regular		874			874
Special		75			75
D and D					
Small		99			99
Regular		422	16	27	465
Special		675			675
Title III		1,868			1,868
NSF-CCI		730			730
TOTAL	3,300	5,088	107	27	8,522
PERCENT	39	60	1	> 1	100

[a] Reduced 5 percent to compensate for smaller proportion of operating unit budgets being devoted to support of personnel as the size of their budgets increase.

[b] Reduced 10 percent for same reason as in preceding footnote.

TABLE 63. NUMBER AND PERCENT OF R, D AND D PROFESSIONAL POSITIONS UNDER MOST OPTIMISTIC PROJECTION OF FUNDING IN FY '74, BY SUB-UNITS

Sub-Units	Director/Staff, outside-funded R, D and D programs	Director/Staff R, D and D projects	Stimulators and coordinators	Director/Staff, R, D and D training programs	Total
PROGRAMS					
Centers					
DEL	1,200[a]				1,200[a]
DCVR	89				89
DESR	68		17		85
HCY	159				159
Policy Study	36				36
Instructional Materials	86				86
Laboratories	1,699[b]				1,699[b]
Clearing Houses	322				322
Research Coord. Units	175				175
State Dept. Res. Divs.	405		73		478
PROJECTS					
Research					
Small		963			963
Regular		971			971
Special		282			282
D and D					
Small		234			234
Regular		480	18	30	528
Special		1,037			1,037
Title III		3,243			3,243
NSF-CCI		786			786
TOTAL	4,239	7,996	108	30	12,373
PERCENT	34	65	1	> 1	100

[a] Reduced 10 percent to compensate for smaller proportion of operating unit funds being devoted to personnel support.

[b] Reduced 15 percent for same reason as in preceding footnote.

Functional emphases in the process of R, D, and D. The number and percent of persons engaged in research, development, and diffusion (in FY '66 unless otherwise indicated) are reported, by sub-units, in Table 64. In the sources examined by the project staff, the 1964 community was found to consist of 95 percent researchers and the balance development and diffusion personnel (see page 71). The population of persons supported by the USOE would be the first to feel (and reflect) the impact of USOE efforts to initiate D and D activities, of course, so some shift in the proportions toward D and D was expected. The extent of the shift in Table 64, to 45 percent engaged in research, 40 percent in development, and 15 percent in diffusion, more nearly reflects the heavy D and D emphases of the educational laboratories and Title III projects than the shift in the overall R, D, and D community, but the change was striking nevertheless.

Tables 65 to 67 report the projections of the base figures to FY '74. Both the proportion and the number of positions in the function areas presented a vastly changed picture of the educational R, D, and D community. For example, under the Most Likely projection:

> Development positions comprised nearly half (47 percent) of positions projected.
>
> The number of development positions projected was almost as large (4,034) as the entire 1964 R, D, and D community--and few in the 1964 community were developers.

Research positions projected in this partial population continued to increase in absolute number, but at the same time continued to decline (to 35 percent) as a proportion of the overall population.

Even if the base proportion of diffusion personnel were maintained, which will not actually be the case, the number of positions projected would be greater than the entire R, D, and D population in schools and colleges of education in 1964.

TABLE 64. BASE NUMBER AND PERCENT OF PERSONS ENGAGED IN RESEARCH, DEVELOPMENT AND DIFFUSION ACTIVITIES, BY SUB-UNITS

Sub-Units	Research	Development	Diffusion	Total
PROGRAMS				
Centers				
DEL	178	107	49	334
DCVR	13	7	19	39
DESR	28[a]	19[a]	9[a]	56[a]
HCY	10[a]	6[a]	4[a]	20[a]
Policy Study	19[b]	--	--	19[b]
Instructional materials	5	15	48	68
Laboratories	20[c]	237[c]	28[c]	285[c]
Clearing Houses	--	5	93	98
Research Coord. Units	227	--	--	227
State Dept. Res. Divs.	68	31	45	144
PROJECTS				
Research				
Small	307	5	5	317
Regular	695	94	27	816
Special	36	--	--	36
D and D				
Small	18	62	10	90
Regular	141	277	105	523
Special	27	134	37	198
Title III	132[d]	270	77	479
NSF-CCI	--	427	87	514
TOTAL	1,924	1,696	643	4,263
PERCENT	45	40	15	100

[a] Number based on FY '68 funding. Distribution arbitrarily designated as approximately that of DEL R and D centers.

[b] Number as of 9/68 according to personnel in both centers.

[c] Based on project analysis of lab. budgets, 6/67.

[d] In analyzing the proposals submitted for Title III centers, the project staff found there was this proportion of research persons among the personnel listed as being needed. Granted, there do have to be planning and data-gathering personnel to support the request for a Title III grant, but in view of the responses received to the project questionnaire regarding center staffing (discussed in Chapter IV) it appeared likely this proportion of research persons would not long be maintained.

TABLE 65. NUMBER AND PERCENT OF R, D AND D POSITIONS UNDER LEAST OPTIMISTIC PROJECTION OF FUNDING IN FY '74, BY SUB-UNITS

Sub-Units	Research	Development	Diffusion	Total
PROGRAMS				
Centers				
DEL	192	116	52	360
DCVR	26	14	38	78
DESR	28	19	9	56
HCY	10	6	4	20
Policy Study	19	--	--	19
Instructional materials	6	19	61	86
Laboratories	54	638	75	767
Clearing Houses	--	8	155	163
Research Coord. Units	175	--	--	175
State Dept. Res. Divs.	153	70	101	324
PROJECTS				
Research				
Small	252	4	4	260
Regular	619	84	24	727
Special	36	--	--	36
D and D				
Small	14	51	8	73
Regular	73	144	55	272
Special	27	134	37	198
Title III	251	513	146	910
NSF-CCI	--	504	103	607
TOTAL	1,935	2,324	872	5,131
PERCENT	38	45	17	100

TABLE 66. NUMBER AND PERCENT OF R, D AND D POSITIONS UNDER MOST LIKELY PROJECTION OF FUNDING IN FY '74, BY SUB-UNITS

Sub-Units	Research	Development	Diffusion	Total
PROGRAMS				
Centers				
DEL	436[a]	263	123	822[a]
DCVR	30	16	43	89
DESR	104	71	33	208
HCY	63	37	25	125
Policy Study	36	--	--	36
Instructional materials	6	19	61	86
Laboratories	85[b]	1,004	121	1,210[b]
Clearing Houses	--	16	296	312
Research Coord. Units	175	--	--	175
State Dept. Res. Divs.	154	71	103	328
PROJECTS				
Research				
Small	335	5	5	345
Regular	744	101	29	874
Special	75	--	--	75
D and D				
Small	20	68	11	99
Regular	125	247	93	465
Special	92	457	126	675
Title III	515	1,053	300	1,868
NSF-CCI	--	606	124	730
TOTAL	2,995	4,034	1,493	8,522
PERCENT	35	47	18	100

[a] Reduced 5 percent to compensate for smaller proportion of operating unit budgets being devoted to personnel support.

[b] Reduced 10 percent for same reason given in preceding footnote.

TABLE 67. NUMBER AND PERCENT OF R, D AND D POSITIONS UNDER MOST OPTIMISTIC PROJECTION OF FUNDING IN FY '74, BY SUB-UNITS

Sub-Units	Research	Development	Diffusion	Total
PROGRAMS				
Centers				
DEL	633[a]	383[a]	184[a]	1,200[a]
DCVR	30	16	43	89
DESR	43	29	13	85
HCY	79	48	32	159
Policy Study	36	--	--	36
Instructional materials	6	19	61	86
Laboratories	119[b]	1,413[b]	167[b]	1,699[b]
Clearing Houses	--	16	306	322
Research Coord. Units	175	--	--	175
State Dept. Res. Divs.	226	103	149	478
PROJECTS				
Research				
Small	933	15	15	963
Regular	827	112	32	971
Special	282	--	--	282
D and D				
Small	47	161	26	234
Regular	142	280	106	528
Special	141	702	194	1,037
Title III	894	1,828	521	3,243
NSF-CCI	--	653	133	786
TOTAL	4,613	5,778	1,982	12,373
PERCENT	37	47	16	100

[a] Reduced 10 percent to compensate for smaller proportion of operating unit budget funds being devoted to personnel support.

[b] Reduced 15 percent for reason given in preceding footnote.

Final Projections of Personnel Demand

Entire populations of educational R, D, and D persons had not been considered in the projections to this point, e.g., intra-institutional researchers, state department personnel not supported by Title V, business and industrial R, D, and D personnel, research and service bureau personnel in schools and colleges of education. These populations will be considered, and logically-derived projections of their growth combined with the baseline projections just presented.

The framework used was that offered by Table 9, "Estimated Number of R, D, and D Personnel by Agency Setting and Functional Job Emphasis--1964," so the section is organized according to the "institutional settings" dimension of the logical structure. The products will be a table for each FY '74 projection comparable to Table 9.

Schools and colleges of education. The several conclusions and projections regarding R, D, and D personnel in this setting are shown in Table 68.

TABLE 68. SUMMARY OF CONCLUSIONS AND PROJECTIONS REGARDING R, D, AND D PERSONNEL IN SCHOOL AND COLLEGE OF EDUCATION SETTINGS

Professional assignment	1964 (Table 9)	Base number (Fy '66–'68)	Projections to FY '74		
			Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS/STAFF	160	597	701	1,489	1,771
PROJECT DIRECTORS/STAFF	NA	1,107	859	1,327	2,060
INDIVIDUAL R, D, AND D PERSONNEL					
Hard-core Producers	115	NA	NA	NA	NA
Regular Producers	265	NA	NA	NA	NA
Occasional Producers	620	NA	NA	NA	NA
STIMULATORS AND COORDINATORS	40	NA	NA	NA	NA
TOTAL	1,200	1,704	1,560	2,816	3,831

NA = Not available.

The 160 program personnel in schools and colleges of education in 1964 were identified for Table 9 as staff assigned to research and service bureaus or institutes. It cannot be said that none of these 160 persons would be among those supported by USOE contracts, and hence included in the baseline projections. These persons would be among the prime contract-getters in a school of education. On the other hand, research bureaus have a full load of their own work which must be done. When a member of their staff goes off on contract, he must be replaced with another person who will, in turn, be supported by the institution, not by USOE. Some small and indeterminate number of regular staff probably are not replaced with other professionals, but their number is probably compensated for by the growth in the number of bureaus and institutes being supported. Consequently, all 160 positions were added to the baseline positions projected.

Another population not heretofore represented was the body of school of education personnel employed--on a part-time basis--by state departments of education to staff the state Research Coordinating Units. Beginning in FY '69, the states will match the federal grants which support the RCU's. The baseline projections already make provision for 44 positions for school of education personnel. The state matching funds will provide support for an additional 44 positions which must be added to the baseline projections.

Project personnel were not reported in Table 9 because the data did not permit that breakdown. It was noted, however, that most project personnel were classified as individual R, D, and D personnel. In considering the support sources for individual R, D, and D personnel (in order to determine the extent to which they might already be represented in the baseline projections), it appeared reasonable to assume

5

that hard-core and regular producers were generally supported by outside funds for the 40 percent and more of the time they devoted to R, D, and D. The experience of the project staff suggested it was also reasonable to assume that support of the occasional research producer was absorbed by the institution and the individual. As a result, here and in several other settings the number of project directors and staff in the baseline projections were re-distributed in the final projections to the "hard core" and "regular" producer categories *in the proportions established in the analysis of the 1964 population*. For schools of education, roughly one third of the project personnel in the baseline projections were re-assigned to the "hard core" category and the balance to the "regular" producer category. The 620 reported in Table 9 may increase the proportion of their time devoted to R, D, and D as a result of the stimulation of ESEA programs. If so, it appeared reasonable to assume their number would be replaced in the occasional producer category by others responding to the continuing expectation of colleges and universities that members of their faculty engage in research as well as instruction and service and should be rewarded for doing so. Indeed, it appeared likely an even greater number would become occasional producers because (1) as will be shown, the number of stimulators and coordinators, who cultivate and assist faculty to engage in R, D, and D may be expected to increase, and (2) the effect of a larger number of their colleagues becoming involved to a greater extent in R, D, and D may be expected to provoke more members of the faculty to swim in the same waters. If the 1964 proportions remained the same (i.e., 62 percent occasional producers to 38 percent hard core and regular producers), the 859 hard core and regular producers in the Least Optimistic projection would be backed up by 1,402 occasional producers, for a total of 2,261 individual R, D, and D personnel versus the 1,000 identified in 1964. An even greater number of occasional producers would be found in the Most Likely (2,165) and Most Optimistic (3,361) projections if the 1964 proportions were, in fact, maintained.

It appeared to the project staff that the increased activity and stimulation wrought by the greater number of school of education faculty involved in R, D, and D activity would make it more difficult for others not to become at least occasional producers; a time commitment of as little as 20 percent is all that would be necessary. Further, institutional commitments to carry out major research and development projects and programs would cause administrators and department chairmen actively to recruit among the ranks of their colleagues. In all, the opportunities appeared likely to seek out the persons needed, so it was decided the 1964 proportion of occasional producers to hard core and regular producers would, indeed, be maintained, and the number of occasional producers cited in the preceding paragraph was added to the baseline projections for this setting.

The number of stimulators and coordinators was expected to increase. There were only 40 identified in Table 9, but there were at least 107 doctoral-granting institutions in education. It was reasoned that, with the advent of increased governmental and private funding for educational R, D, and D, more of these institutions would employ a person to coordinate their institutional response. On the assumption that all doctoral-granting institutions would require this service, 107 stimulators and coordinators were added to the baseline projections.

The final projections for schools and colleges of education, then, were as follows:

TABLE 69. FINAL PROJECTIONS OF FY'74 DEMAND FOR R, D, AND D PERSONNEL IN SCHOOLS AND COLLEGES OF EDUCATION

Professional assignment	Projections		
	Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS/STAFF			
Base-line projections	701	1,491	1,774
Research bureaus and institutes	160	160	160
State dept.-supported staff in RCU's	44	44	44
Sub-total	905	1,715	1,978
INDIVIDUAL R, D, AND D STAFF			
Hard-core producers	260	402	623
Regular producers	599	925	1,437
Occasional producers	1,402	2,165	3,361
Sub-total	2,261	3,492	5,421
STIMULATORS AND COORDINATORS	107	107	107
TOTAL	3,273	5,314	7,506

Before leaving this setting, interesting comparisons may be drawn between the situation in 1964 and the Most Likely projection of the FY '74 situation:

> In 1964, the number of hard core producers in this setting was 115. In 1974, the R and D center program (which is categorized here) _by itself_ may require a seven-fold increase in these personnel, to 822 persons.
>
> In 1964, no more than 10 percent of the 1,200 R, D, and D personnel in this setting were engaged in diffusion activities. In 1974, the ERIC clearing houses may require 17 times as many diffusion persons in this setting.
>
> In 1964, the two R and D centers in vocational education did not exist. By 1974, R and D centers in this area may require 89 professional staff. During the intervening decade, fewer than 50 new doctorates will be granted in vocational education.

Schools and departments of psychology. To this point, conclusions have been reached and projections made regarding R, D and D personnel in this setting as shown in Table 70.

TABLE 70. SUMMARY OF CONCLUSIONS AND PROJECTIONS REGARDING R, D, AND D PERSONNEL IN SCHOOLS AND DEPARTMENTS OF PSYCHOLOGY

Professional assignment	1964 (Table 9)	Base number (FY '66-'68)	Projections to FY '74		
			Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS/STAFF	70	10	15	41	47
PROJECT DIRECTORS/STAFF	NA	225	197	283	455
INDIVIDUAL R, D, AND D PERSONNEL					
Hard-core Producers	46	NA	NA	NA	NA
Regular Producers	150	NA	NA	NA	NA
Occasional Producers	234	NA	NA	NA	NA
TOTAL	500	235	212	324	502

NA = Not available.

The 70 program directors and staff in schools and departments of psychology in 1964 were identified as being employed in the conventional research bureaus found in the behavioral and social sciences. The same argument advanced for adding the entire corps of education research bureau directors and staff to the baseline projections could be mounted here, but with somewhat less conviction. Research bureaus outside education are less likely to have "their own work to do" and do not rely as heavily on a fixed core staff. Nevertheless, with the thought that the increase in the number of such bureaus would offset losses of core staff to USOE and NSF contracts, all 70 were added to the baseline projections.

TABLE 71. FINAL PROJECTION OF FY'74 DEMAND FOR R, D, AND D PERSONNEL IN SCHOOLS AND DEPARTMENTS OF PSYCHOLOGY

Professional assignment	Projections		
	Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS/STAFF			
Base-line projections	15	41	47
Research bureaus and institutes	70	70	70
Sub-total	85	111	117
INDIVIDUAL R, D, AND D PERSONNEL			
Hard-core producers	46	67	107
Regular producers	151	216	348
Occasional producers	234	336	543
Sub-total	431	619	998
TOTAL	516	730	1,115

Other behavioral and social science departments and other discipline and academic areas. Table 72 presents the final projections regarding R, D, and D personnel in these two settings.

TABLE 72. FINAL PROJECTIONS OF FY'74 DEMAND FOR R, D AND D PERSONNEL IN OTHER BEHAVIORAL AND SOCIAL SCIENCE DEPARTMENTS AND IN OTHER DISCIPLINE AND ACADEMIC DEPARTMENTS

	Other Behav. and Soc. Sci.			Other Disc. and Academic		
Professional assignment	Least Optimistic	Most Likely	Most Optimistic	Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS AND STAFF						
Base-line projections	9	35	41	6	17	18
Research Bureaus and Institutes	64	64	64	20	20	20
Sub-total	73	99	105	26	37	38
INDIVIDUAL R, D AND D PERSONNEL						
Hard Core Producers	91	126	192	175	265	373
Regular Producers	161	223	339	326	493	693
Occasional Producers	211	376	445	539	815	1,146
Sub-total	463	725	976	1,040	1,573	2,212
STIMULATORS AND COORDINATORS	1	1	1	14	14	14
TOTAL	537	925	1,082	1,080	1,624	2,264

The method used to obtain the final figures in these settings was the same as used in the education and psychology settings, i.e., (1) addition of bureau personnel to the baseline projection totals reported in Table 9, since they were either (a) supported by funding agencies or institutions not included in this study or (b) replaced by other staff, or (c) compensated for by the growth of new bureaus; (2) addition of the stimulators and coordinators who coordinate institutional R, D, and D programs; (3) conversion of project personnel to hard core and regular producer categories in the same proportion as was found in 1964; and (4) addition to the occasional producer category of the number of positions needed to maintain the proportions presented in Table 9.

The following observations may be made about the demand for non-educationists in the college and university setting:

> Non-educationists comprised 56 percent of the estimated R, D and D population in college and university settings in 1964 outside of college and university administration units. Though their number would increase 2 1/2 times by FY '74 under the Most Likely projection, they would comprise just 38 percent of the R, D, and D population in colleges and universities by that time.
>
> In FY '66, the Course Content Improvement program of NSF employed 261 non-educationists in college and university settings. Two program administrators, interviewed two years apart, both spoke feelingly of the difficulty of maintaining a high degree of quality at that level of employment. Both maintained the possibility of their program being held at current levels because the supply of quality personnel was almost inadequate for the demand.

> Yet in FY '74, under the Most Likely projection, regular and special D and D projects will require the services of 369 additional non-educationists in colleges and universities for course content improvement and curriculum-building activities. Also by then NSF-CCI demand will itself have increased by 42 percent (110 positions).
>
> If special (basic) research projects were funded at the Most Optimistic level in FY '74, the demand for 282 non-educationist basic researchers would exceed twice the estimated number of hard core, non-educationist persons in the 1964 educational R, D, and D community.

College and university administration units. The populations identified in this setting in 1964 were characterized as follows:

150 intra-institutional researchers

7 regular producers

48 occasional producers, who were largely general administrators attempting to maintain their identity with their scholarly community

With the possible exception of the seven regular producers, there appeared little likelihood of there being any duplication between the baseline population and those described above. As a result, all but the seven regular producers were combined with the baseline projections to secure the final projections in this setting, depicted in Table 73. Project personnel were again re-distributed between the hard core and regular producer categories, using 1964 proportions. Occasional producers were added in the number needed to maintain the 1964 proportions.

TABLE 73. FINAL PROJECTIONS OF FY '74 DEMAND FOR R, D, AND D PERSONNEL IN COLLEGE AND UNIVERSITY ADMINISTRATION UNITS

Professional assignment	Projections		
	Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS/STAFF (TABLE 9)	150	150	150
INDIVIDUAL R, D, AND D PERSONNEL			
Regular Producers	10	13	24
Occasional Producers	69	89	165
Sub-total	79	102	189
TOTAL	229	252	339

Federal agencies. As was done in Chapter II, only U. S. Office of Education personnel were considered in this setting. Some more recent data were made available by the Green Committee as a result of their study of the Office of Education.[40] The data for 1966 in their report compared to the data in 1964 described in Chapter II are presented in Table 74.

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[40] *Study of the U. S. Office of Education*, *op. cit.*

TABLE 74. 1964 AND 1966 PERSONNEL DATA ON R, D, AND D PERSONNEL IN THE U. S. OFFICE OF EDUCATION

Professional assignment	1964	1966
PROGRAM DIRECTORS/STAFF	37	136
INDIVIDUAL R, D AND D PERSONNEL		
Hard Core Producers	31	--
Regular Producers	46	--
Occasional Producers	23	--
STIMULATORS AND COORDINATORS	20	20
TOTAL	157	156

There were, according to the Green Committee report, 243 staff members in the National Center for Educational Statistics[41] and 67 in the Office of Program Planning and Evaluation[42] in 1966. Table A of the report,[43] titled "Office of Education Employment as of October 1, 1966," indicated that 44 percent of the "staff" of USOE were GS-11 grade or above, i.e., of professional status. Therefore, the figure in Table 74 for program directors and staff represents 44 percent of the total staff in the two offices.

There were 270 staff in the Bureau of Research,[44] 44 percent of which (to use the proportion derived in the preceding sentence) equaled 119 professional positions. As in 1964, it appeared there were approximately 20 research administrators in the Bureau, and they were again categorized as Stimulators and Coordinators. The 99 remaining had been categorized in 1964 as Individual R, D, and D Personnel. Since then the Office of Education re-deployed that group to staff its research and development support program. Few, if any, are able any longer to conduct even an occasional normative study, so they were dropped from the final projections.

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[41] *Ibid.*, p. 758.

[42] *Ibid.*, p. 765.

[43] *Ibid.*, p. 37.

[44] *Ibid.*, p. 205.

Since no basis for projection beyond the 1966 figures was available, and there were no baseline projections with which to combine them, the 1966 figures were, at once, the final projections in this setting as well.

Departments of education. State departments of education were the only state agency included in the 1964 description and considered here.[45] To this point, the figures in Table 75 have been concluded and projected regarding R, D, and D personnel in state agencies.

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[45] It was assumed the 12 to 17 positions in the baseline projections for the setting "Other State Agencies" were largely duplications of persons counted in 1964 as Individual R, D, and D personnel, so they were not retained in the final projections.

TABLE 75. SUMMARY OF CONCLUSIONS AND PROJECTIONS REGARDING R, D, AND D PERSONNEL IN STATE DEPARTMENTS OF EDUCATION

Professional assignment	1964 (Table 9)	Base number (FY '66-'68)	Projections to FY '74		
			Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS/STAFF	240	339	488	500	650
PROJECT DIRECTORS/STAFF	NA	19	13	19	21
INDIVIDUAL R, D AND D PERSONNEL					
Hard Core Producers	25	NA	NA	NA	NA
Regular Producers	25	NA	NA	NA	NA
Occasional Producers	65	NA	NA	NA	NA
Sub-total	115	--	--	--	--
STIMULATORS AND COORDINATORS	10	NA	NA	NA	NA
TOTAL	365	358	501	519	671

NA = Not available.

The 240 program personnel identified in 1964 were study, planning, evaluation and research persons supported by state funds. Persons added to research divisions through Title V funds (and included in the baseline projections as a result) were new personnel, so the 240 represented a population not yet included in the projections. It was recognized that number did not account for R, D, and D persons supported by state funds added since 1964, but the extent of those additions was not known.

Another group of program positions as yet unrepresented were the additional state department positions to be supported in the enlarged RCU's. Prior to FY'69 the RCU's operated with annual budgets averaging $65,000. At that level, 170 state department personnel were supported (see Table 56). In FY '69, and thereafter, both the USOE and the individual states were to contribute $50,000 to the support of each RCU--$100,000 in all. At that level of funding, 262 positions could be supported (rather than 170), half by the USOE funds (and counted in the baseline projections) and half by state funds. It was assumed the state departments would first pick up the 39 extant positions not picked up by USOE funds (i.e., 170 persons minus 131 positions equaled 39 positions still to be supported). Then, with the balance of their funds, the state departments could support 92 new positions (131 total less the 39 extant positions picked up). These 92 positions were also added to the baseline projections.

Nothing more could be done to delineate the R, D, and D activity of Individual R, D, and D Personnel than was done for Table 9. There were few project positions in the baseline projections (13 to 21 positions). It was assumed the project personnel in the baseline projections were largely duplicates of the Individual R, D, and D Personnel identified in 1964, so only the individual personnel in the 1964 description were retained in the final projections.

The stimulators and coordinators identified in 1964 were added to the final projections, since their positions were supported by state funds.

The final projections for this setting, then, are presented in Table 76.

TABLE 76. FINAL PROJECTION OF FY '74 DEMAND FOR R, D, AND D PERSONNEL IN STATE EDUCATION AGENCIES

Professional assignment	Projections		
	Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS/STAFF			
Baseline Projections	488	500	650
State Dept.-supported R, D and D Personnel	240	240	240
State Dept.-supported RCU Personnel	92	92	92
Sub-total	820	832	982
INDIVIDUAL R, D AND D PERSONNEL			
Hard Core Producers	25	25	25
Regular Producers	25	25	25
Occasional Producers	65	65	65
Sub-total	115	115	115
STIMULATORS AND COORDINATORS	10	10	10
TOTAL	945	957	1,107

Schools and school systems. The 1964 populations reported in Table 9 were:

265 persons in research programs of school systems

5 stimulators and coordinators

10 hard core producers

120 regular producers

140 occasional producers.

The research divisions of school systems, like research and service bureaus in schools of education, have "their own work to do," whether some members of their staff depart for Title III centers, development projects, or elsewhere. At least 265 positions would be supported by school systems, then, and that number of program personnel was added to the final projections.

The five Stimulators and Coordinators identified in 1964 were also added to the final projections because they would be institutionally-supported rather than supported by outside contract.

The Individual R, D, and D Personnel were not added to the final projections. Since the demand for qualified persons to direct and staff the new Title III centers will be so great, it was assumed that the Individual R, D, and D Personnel would find an outlet for their skills through Title III projects, and so would be counted in the baseline projections.

Since school personnel were not typically multiple-function people, project personnel in the baseline projections were not redistributed among the hard core, regular, and occasional producer categories. Instead, they were maintained as "Project Directors and Staff." The final projections for this setting are presented in Table 77.

TABLE 77. FINAL PROJECTIONS OF THE FY '74 DEMAND FOR R, D AND D PERSONNEL IN SCHOOLS AND SCHOOL SYSTEMS[46]

Professional assignment	Projections Least Optimistic	 Most Likely	 Most Optimistic
PROGRAM DIRECTORS AND STAFF (TABLE 9)	265	265	265
PROJECT DIRECTORS AND STAFF (BASELINE)	937	1,917	3,318
STIMULATORS AND COORDINATORS (TABLE 9)	5	5	5
TOTAL	1,207	2,187	3,588

Before leaving the setting, two interesting comparisons were drawn between the 1964 description and the final Most Likely projection of project personnel:

> The number of project personnel needed for R, D, and D activity in public schools (2,187) compared favorably with the total number of individual R, D, and D personnel in all settings in 1964 (2,440). Project personnel were included among individual personnel in the 1964 description.
>
> Most school personnel were assigned to project work full time. If full-time participation were assumed for all project personnel projected in this setting, and if it were further assumed that the medium amount of time devoted to R, D, and D by the 315 hard core

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[46] Includes project personnel in Other Schools and School Systems settings since there were so few of them (i.e., three in the Least Optimistic projection, three in the Most Likely projection, and four in the Most Optimistic projection).

> and 771 regular producers in 1964 was 50 percent, then in 1974 four times as much time and attention will be given to R, D, and D in this one setting as was given by hard core and regular producers in all settings in 1964. Given any kind of reasonable planning and coordination, the commitment of human resources on that order of magnitude should surely produce desirable results.

Private research institutes and agencies. In Table 9, personnel in private research institutes (e.g., American Institutes for Research, Science Research Associates) and in private social service and welfare agencies were included in this setting, so they are included in this discussion as well. The number identified in 1964 was 300, all of whom were categorized as program personnel. It appeared to the project staff that the prospects for growth in this setting were excellent, since there was a strong possibility that private development agencies might well grow to a number and size equal to private research institutes. The potential for growth appeared, in fact, to be comparable to the potential for business and industrial organizations which, the reader will see, was set at eight to 16 times their current size. Indeed, were there to be even a slight lessening of emphasis on not-for-profit activity in the private institutes and agencies, they would readily blend with the new business and industrial organizations in the "learning business."

The final projections in this setting, then, were derived by computing an increase in the 1964 population of 300 program personnel of 800 percent for the least Optimistic projection, 1,200 percent for the Most Likely projection, and 1,600 percent for the Most Optimistic projection. The results (which were considered to include the relatively few positions in the baseline projections) were:

Least Optimistic--2,400 program directors and staff
Most Likely --3,600 program directors and staff
Most Optimistic --4,800 program directors and staff

Professional associations. Included in this setting in Table 9 and in the discussion below were personnel in professional education and related professions, public, and lay associations. Ninety program personnel were reported in this setting in 1964. The baseline projections suggested the chief addition to that number would come from association involvement in the ERIC dissemination activity through sponsorship of clearing houses. It appeared to the project staff that the professional associations simply lacked resources to make much more of an effort in R, D, and D than that, so the final projections for this setting (presented in Table 78) simply combined the in-house research staffs reported in Table 9 with the essentially ERIC-related positions in the baseline projections.

TABLE 78. FINAL PROJECTIONS OF THE FY '74 DEMAND FOR R, D, AND D PERSONNEL IN PROFESSIONAL ASSOCIATIONS

Professional assignment	Projections		
	Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS AND STAFF			
Reported in Table 9	90	90	90
Baseline Projections	31	60	62
PROJECT DIRECTORS AND STAFF (BASELINE)	259	399	494
TOTAL	380	549	646

Inter-agency organizations. Included in this setting were educational laboratories and other inter-agency organizations. The number of positions available in the former setting appeared in the baseline projections. The number of persons in the latter setting in 1964 (since the educational laboratories had not then been formed) was reported in Table 9 to be 50 personnel. That number appeared certain to grow because of the popularity of the inter-agency mechanism, e.g., the Compact of States, Association of Great Lakes Colleges. These associations generally engage in data-gathering as a major portion of their service to their constituent institutions. Since the number of inter-agency organizations which may be created was not known, the project staff used the same rate of growth here as was finally projected for R, D, and D personnel in schools and colleges of education, i.e., 1:2.73 for the Least Optimistic projection, 1:4.43 for the Most Likely projection, and 1:6.26 for the Most Optimistic projection.[47] The results are presented in Table 79.

TABLE 79. FINAL PROJECTIONS OF THE FY '74 DEMAND FOR R, D, AND D PERSONNEL IN INTER-AGENCY ORGANIZATIONS

Professional assignment	Projections		
	Least Optimistic	Most Likely	Most Optimistic
PROGRAM DIRECTORS AND STAFF			
Educational Laboratories (Baseline projections)	767	1,210	1,699
Inter-Agency Organizations	137	232	313
TOTAL	904	1,442	2,012

Business and industrial organizations.[48] This setting was not strongly represented in either the 1964 description or the baseline projections. The former suggested there were no fewer than 150 R, D, and D persons in this setting; the latter, because there were no persons in this setting in the USOE and NSF proposals sampled in FY '66, projected no persons in this setting. The size of the investment being made by many major corporations indicated that the number of positions supported by business and industrial organization in 1974 would be many times the combined totals of the 1964 description and the baseline projections. For example, one report states that industry may spend 10 to 20 times its 1966 expenditures on educational technology by 1976, i.e., an increase in spending from $500 million in 1966 to $5 to $10 billion in 1976.[49] Reducing the anticipated growth 20 percent (to 1974 instead of 1976) still produced an increase in spending of eight to 16 times above 1966 expenditures. On that basis, the Least Optimistic endpoint was placed at eight times the 1964 population; the Most Likely, 12 times; and the Most Optimistic, 16 times, as follows:

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[47] Derived by using the conclusion in Table 9 that there were 1,200 R, D, and D persons employed in that setting in 1964 as the beginning point and the final projections as the endpoints.

[48] The setting "Private Foundations" was omitted because the data collection for the project failed to indicate

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contributions to educational R, D, and D of persons employed by (not supported by) private foundations. However, the project staff did attempt to gauge the extent to which private funds would increase the demand for educational R, D, and D persons by examining issues of Foundation News. The results obtained by this method were inconclusive, but some interesting information on major foundation givers and the R, D, and/or D focus of various foundations are reported in Appendix E.

[49] Phi Delta Kappan, XLVIII, 1 (September, 1966), p. 22.

Least Optimistic--1,200 positions (8 X 150)

Most Likely --1,800 positions (12 X 150)

Most Optimistic --2,400 positions (16 X 150)

Before proceeding further, two additional comparisons with the 1964 description may be of interest:

> Under the Most Likely projection, by 1974 the educational laboratories would themselves require the services of a population of program personnel almost four fifths the size of the entire population of program personnel in 1964.
>
> "Inter-Agency Organizations" and "Business and Industrial Organizations" were two of the least significant settings (in terms of personnel demand) in 1964. By FY '74, the former would come close to equaling, and the latter exceeding, the entire estimated population of program personnel in 1964.

Tables 80 to 82 draw together the final projections of demand for the various settings. The first item the reader is likely to notice is that demand for educational R, D, and D persons may triple between 1964 and 1974 (under the Least Optimistic projection), but will probably increase 4.7 times by 1974 and could (under the Most Optimistic projection) require 6.5 times the number of positions estimated in 1964.

The reader will also notice that schools and colleges of education remain the primary setting for educational R, D, and D under these projections. The surge in non-governmental demand, particularly in private research (and development) institutes and agencies and in business and industrial organizations is quite noticeable. The largest proportionate increases occur in inter-agency organizations, private R and D institutes, and business and industrial organizations.

On the other dimension of Tables 80 to 82, the shift in demand toward programatic (as opposed to project and individual) positions is noticeable. Program personnel constituted 39 percent of the 1964 population; under the Most Likely projection to 1974, the proportion of program personnel is 53 percent. That result is attributable to the new directions established with passage of the ESEA, of course.

TABLE 80. LEAST OPTIMISTIC PROJECTION OF R, D AND D POSITIONS BY AGENCY SETTING AND FUNCTIONAL JOB EMPHASIS--1974

Setting	R, D and D Program Directors and Staff	R, D and D Project Directors and Staff	Individual R, D and D personnel			Stimulators and Coordinators	Total
			Hard-core Producers	Regular Producers	Occasional Producers		
Schools and Colleges of Education	905		260	599	1,402	107	3,273
Schools and Depts. of Psychology	85		46	151	234		516
Other Behavioral and Social Science Departments	73		91	161	211	1	537
Other Discipline and Academic Departments	26		175	326	539	14	1,080
College and University Administration Units	150			10	69		229
U. S. Office of Education	136					20	156
State Departments of Education	820		25	25	65	10	945
Schools and School Systems	265	937				5	1,207
Private Research Institutes and Agencies	2,400						2,400
Professional and Lay Associations	121	259					380
Inter-agency Organizations	904						904
Business and Industrial Organizations	1,200						1,200
TOTAL	7,085	1,196	597	1,272	2,520	157	12,827

TABLE 81. MOST LIKELY PROJECTION OF R, D AND D POSITIONS BY AGENCY SETTING AND FUNCTIONAL JOB EMPHASIS--1974

Setting	R, D and D Program Directors and Staff	R, D and D Project Directors and Staff	Individual R, D and D personnel			Stimulators and Coordinators	Total
			Hard-core Producers	Regular Producers	Occasional Producers		
Schools and Colleges of Education	1,715		402	925	2,165	107	5,314
Schools and Depts. of Psychology	111		67	216	336		730
Other Behavioral and Social Science Depts.	99		126	223	376	1	825
Other Discipline and Academic Departments	37		265	493	815	14	1,624
College and University Administration Units	150			13	89		252
U. S. Office of Education	136					20	156
State Departments of Education	832		25	25	65	10	957
Schools and School Systems	265	1,917				5	2,187
Private Research Institutes and Agencies	3,600						3,600
Professional and Lay Associations	150	399					549
Inter-agency Organizations	1,442						1,442
Business and Industrial Organizations	1,800						1,800
TOTAL	10,337	2,316	885	1,895	3,846	157	19,436

TABLE 82. MOST OPTIMISTIC PROJECTION OF R, D AND D POSITIONS BY AGENCY SETTINGS AND FUNCTIONAL JOB EMPHASIS--1974

Setting	R, D and D Program Directors and Staff	R, D and D Project Directors and Staff	Individual R, D and D personnel			Stimulators and Coordinators	Total
			Hard-core Producers	Regular Producers	Occasional Producers		
Schools and Colleges of Education	1,978		623	1,437	3,361	107	7,506
Schools and Depts. of Psychology	117		107	348	543		1,115
Other Behavioral and Social Science Depts.	105		192	339	445	1	1,082
Other Discipline and Academic Departments	38		373	693	1,146	14	2,264
College and University Administration Units	150			24	165		339
U. S. Office of Education	136					20	156
State Departments of Education	982		25	25	65	10	1,107
Schools and School Systems	265	3,318				5	3,588
Private Research Institutes and Agencies	4,800						4,800
Professional and Lay Associations	152	494					646
Inter-agency Organizations	2,012						2,012
Business and Industrial Organizations	2,400						2,400
TOTAL	13,135	3,812	1,320	2,866	5,725	157	27,015

Under the Most Likely projection of personnel demand, the following were indicated:

> Growth in demand on the order of 1:4.4 would occur in schools and colleges of education, but, more importantly, a major portion of that increased demand would be for persons making a career commitment to educational R, D, and D. Thus, the proportion of program personnel increased to 32 percent of the total, versus 13 percent in 1964.
>
> An approximate 50 percent increase in demand for persons employed in schools and departments of psychology and a doubling of the demand for persons in other behavioral and social science departments would produce little variation in the form or nature of the commitment made to educational R, D, and D.
>
> The commitment of persons in other discipline and academic areas would similarly vary little, but because of the demand for their services by (1) regular and special D and D projects, and (2) NSF course content improvement projects perhaps eight times as many positions would be available in 1974 as were estimated in 1964.
>
> Little change would occur among persons in college and university administration units, either in their number or in the form of their commitment to educational R, D, and D.
>
> Demand for R, D, and D persons in the U. S. Office of Education would be similarly static. The major demand foreseen here was for program managers and processing personnel (not limited to R, D, and D programs).
>
> An approximate tripling of demand for R, D, and D program personnel in state departments of education would increase the possibility, at least, of state departments' having sufficient personnel to prepare state plans, stimulate innovation, evaluate major programs, and conduct research on the effectiveness of educational programs in their state.
>
> Growth in demand for development and diffusion personnel (primarily) on the order of four times the 1964 population would occur in schools and school systems, but a continuation of current staffing patterns would

result in much of the activity being either (1) inner-directed demonstration of quality facets of the regular school program, or (2) provision of additional "special services" normally provided by many school systems.

Creation of an educational development capability equivalent to the research capability in the private sector of the economy would result in a 1,200 percent increase in demand for R, D, and D personnel in *private research (and development) institutes and agencies*, thereby moving it into the position of being the second largest setting (after schools and colleges of education) for R, D and D personnel.

Projected growth in *professional associations* of 1:6 *vis-a-vis* the 1964 population would be attributable to increases in diffusion personnel in ERIC clearing houses.

Growth in demand on the order of 1:28 would occur among inter-agency organizations because of the expansion of both the educational laboratories and other *inter-agency organizations*. The personnel in these programs would all be embarking on a new tack in their career lines, since these are predominantly new programs with new objectives, so staffing would continue to be a matter for concentrated attention by the directors of these programs.

Increased demand on the order of 1,200 percent would reflect the expanded interest, involvement, and capital investment of *business and industrial organizations* in educational development and diffusion.

Functional emphases in the process of R, D, and D.

The conclusions reached and projections made to this point regarding the demand for personnel according to their functional emphases in the process of R, D, and D have been brought together in Table 83.

TABLE 83. SUMMARY OF CONCLUSIONS AND PROJECTIONS REGARDING FUNCTIONAL EMPHASES IN THE PROCESS OF R, D, AND D

Functional emphases in R, D, and D process	1964 (Table 9)		Base number (FY '66 -'68)		Projections to FY '74					
					Least Opt.		Most Likely		Most Opt.	
	No.	%	No.	%	No.	%	No.	%	No.	%
Research	3,944	95.6	1,924	45	1,935	38	2,995	35	4,613	37
Development	132	3.2	1,696	40	2,324	45	4,034	47	5,778	47
Diffusion	49	1.2	643	15	872	17	1,493	18	1,982	16
TOTAL	4,125	100	4,263	100	5,131	100	8,522	100	12,373	100

These data suggested there had been, and would continue to be, a shift away from support of research (although the actual number of research positions to be available continued to grow) toward D and D. An internal accounting document of the USOE Budget Office confirmed the shift. Administrators of the programs included in this study reported allocation of FY '67 expenditures and FY '68 appropriations for R, D and D purposes as follows:

	Percent in FY '67	Percent in FY '68
Research	46	36
Development	33	44
Diffusion	18	17
Training	2	3

The proportions reported for FY '68 appropriations were quite comparable to the proportions suggested by the Most Likely projection, but did not differ to any great degree even from the computed and externally-suggested projections. It did not appear likely the shift in funding support from FY '67 to FY '68 would remain constant to FY '74. The projections reflected only major changes in emphasis expected to occur within programs, e.g., regular D and D projects, ESEA Title III. Similar but less visible changes will no doubt occur within other programs. Therefore, the final projections were extended slightly along the present tendency from research to D and D and the final proportions projected were:

	Percent
Research	33
Development	50
Diffusion	17

As products are prepared, the proportion of funds allocated to diffusion may be expected to increase at the expense of both research and development.

Summary

In order to keep separate the sources of data for the projections of personnel, both baseline and final projections of personnel demand were prepared. The former were incomplete, but were based on empirical data gathered largely from a sample of U. S. Office of Education and National Science

Foundation proposals approved for funding in FY '66. Logically-derived projections of growth in populations, which were not at that point represented in the projections, were later combined with the baseline projections to form the final personnel projections of the study.

Summary

The summaries of the three other major sections of this chapter, i.e., (1) procedures, (2) funding projections, and (3) personnel projections have been drawn together to form this final major section.

Summary of Procedures

The strategy adopted for making projections of personnel was (1) to relate research, development, and diffusion (R, D, and D) personnel to the funds available for these purposes, and (2) to project an increase in demand for R, D, and D personnel which was related to projected increases in R, D, and D funds. Required to carry out this strategy was: (1) selection of support programs which created, or appeared likely to create, important demand for R, D, and D personnel; (2) a description of personnel supported by these programs at a given level of funding; (3) projection of the support funds to be made available to the selected programs (in this case to 1974); (4) projection of the positions which could be supported by the programs to a level equivalent to the projected level of funding; and (5) adjustment of the personnel projections to accomodate positions not supported, and consequently not accounted for by the selected support programs.

Selection of support programs. The support programs selected were (1) those created or fostered by the Elementary and Secondary Education Act of 1965 in the U. S. Office of Education, since they appeared likely to be the primary determiners of demand for R, D, and D personnel, and (2) the Course Content Improvement Program of the National Science Foundation, since it appeared likely some of the new activities of the USOE would develop along lines the NSF-CCI had followed for several years.

Description of personnel supported. A description of the personnel supported in these selected programs was obtained by applying the logical structure of the study to a sample of proposals the USOE and NSF programs had approved for funding in FY '66. Included in the description of personnel for each program were (1) the number supported, (2) the settings in which they would be employed, (3) their job assignments, and (4) their R, D, and D emphases. The funding available to support these persons was obtained from program personnel, since no single source could supply funding data a t the (sub-unit) level required by the study.

Projection of support funds. Since the cost of conducting research, development, and diffusion will continue to increase between FY '66 and FY '74, a "no real gain" projection was prepared which indicated the equivalent funds needed in FY '74 to support each program at the level it had achieved in FY '66. Thus, the product of the "no real gain" projection was termed the "equivalent funding base."

To secure added utility, three projections of personnel were required, rather than one. Three projections of funding were also prepared, then, to serve as bases for the personnel projections desired. Using a technique appropriated from the planning aid called Program Evaluation and Review Technique (PERT), projections were prepared at minimal, optimal, and most likely levels of attainment. These were termed "Least Optimistic," "Most Optimistic," and "Most Likely" projections. The first two were furnished, either by calculation or by external estimate of program administrators. The Most Likely projection was produced by the project staff, using the evidence available to project the future funding levels of the various types of sub-units employed by programs to carry out their activities, i.e.,the projects, centers, laboratories, clearing houses, and other structural devices employed to achieve program objectives.

The three endpoints projected for each sub-unit were compared with the equivalent funding base (previously discussed) to secure a measure of the extent of difference between the two, a measure termed here as the "growth ratio." The growth ratio was the tool used to translate funding projections to projections of demand for R, D, and D personnel.

Projection and adjustment of R, D, and D positions. The first (baseline) projections of personnel demand were calculations of demand as indicated by the growth ratio. Logically-derived projections of demand for populations of persons identified in the 1964 community but not yet represented here were combined with the baseline projections to secure the final personnel projections of the study.

Summary of Funding Projections

The three projections of funding to FY '74 (i.e., Least Optimistic, Most Likely, and Most Optimistic) were then prepared for 18 sub-units, to serve as bases for the three projections of personnel desired. Each of the three endpoints projected was compared with its equivalent funding base to measure the extent of difference between each projected endpoint and the amount needed to support the personnel in the FY '66 people base, i.e., to secure the growth ratio.

In the aggregate, the growth ratios secured indicated the Least Optimistic projection of personnel to FY '74 (after increases in costs and inflationary effects were accommodated) would be 1:1.18; the Most Likely projection, 1:2.04; and the Most Optimistic projection, 1:2.89 in relation to FY '66 personnel.

In terms of sheer growth, according to the Most Likely projection the most expansive sub-unit forms would be the

(1) HCY R and D centers (which represented as much a re-structuring of program as an expansion of program), (2) educational laboratories, (3) Title III centers, (4) national laboratories, (5) special development and diffusion projects, and (6) ERIC clearing houses. The least expansive sub-unit forms were projected as the (1) Research Coordinating Units (a special case since state matching funds are to be forthcoming), (2) regular D and D projects, (3) regular research projects, (4) small research projects, and (5) small D and D projects.

Should funds remain tight, only the educational laboratories and vocational education R and D centers would grow significantly. The sub-units most adversely affected would be regular D and D projects, the RCU's (again, a special case), and small and regular R, D, and D projects.

A characterization of the situation depicted might be:

> development and diffusion programs and projects are to be given greatest support
>
> if funds remain tight, the support given development and diffusion will be at the expense of research projects
>
> programs are to be supported beyond projects
>
> since the more expansive programs are in new settings (laboratories, public schools) and directed toward new activities (special D and D projects, clearing houses), the near future will be a period of turbulent organizational and role change and ESEA-created and -fostered programs will be leading the press for organizational and role change.

Summary of Personnel Projections

In order to keep separate the sources of data for the projections of personnel, both baseline and final projections of personnel demand were prepared. The former were incomplete, but were based on empirical data gathered largely from a sample of U. S. Office of Education and National Science Foundation proposals approved for funding in FY '66. Later combined with the baseline projections to form the final personnel projections of the study were logically-derived projections of growth in populations which were not, at that point, represented in the projections.

Under the Most Likely projection of personnel demand, the following were indicated:

> Growth in demand on the order of 1:4.4 would occur in schools and colleges of education, but, more importantly, a major portion of that increased demand would be for persons making a career commitment to educational R, D, and D. Thus, the proportion of program personnel increased to 32 percent of the total, versus 13 percent in 1964.
>
> An approximate fifty percent increase in demand for persons employed in schools and departments of psychology and a doubling of the demand for persons in other behavioral and social science departments would produce little variation in the form or nature of the commitment made to educational R, D, and D.
>
> The commitment of persons in other discipline and academic areas would similarly vary little, but because of the demand for their services by (1) regular and special D and D projects, and (2) NSF course content improvement projects perhaps 8 times as many positions would be available in 1974 as were estimated in 1964.
>
> Little change would occur among persons in college and university administration units, either in their number or in the form of their commitment to educational R, D, and D.

Demand for R, D, and D persons in the U. S. Office of Education would be similarly static. The major demand foreseen here was for program managers and processing personnel (not limited to R, D, and D programs).

An approximate tripling of demand for R, D, and D program personnel in state departments of education would increase the possibility, at least, of state departments having sufficient personnel to prepare state plans, stimulate innovation, evaluate major programs, and conduct research on the effectiveness of educational programs in their state.

Growth in demand for development and diffusion personnel (primarily) on the order of four times the 1964 population would occur in schools and school systems. Continuation of current staffing patterns would result in much of the activitiy in this setting being either (1) inner-directed demonstrations of quality facets of the regular school program, or (2) provision of additional "special services" normally provided by many school systems.

Creation of an educational development capability equivalent to the research capability in the private sector of the economy would result in a 1,200 percent increase in demand for R, D, and D personnel in private research (and development) institutes and agencies, thereby moving it into the position of being the second largest setting (after schools and colleges of education) for R, D, and D personnel.

Projected growth in professional associations of 1:6 vis-a-vis the 1964 population would be attributable to increases in diffusion personnel in ERIC clearing houses.

Growth in demand on the order of 1:28 would occur among inter-agency organizations because of the expansion of both the educational laboratories and other inter-agency organizations. The personnel in these programs would all be embarking on a new tack in their career lines, since these are predominantly new programs with new objectives, so staffing would continue to be a matter for concentrated attention by the directors of these programs.

> Increased demand on the order of 1,200 percent would reflect the expanded interest, involvement, and capital investment of business and industrial organizations in educational development and diffusion.

A continuing shift in the allocation of monetary and human resources toward development and diffusion was projected to result in 1974 allocations on the order of 33 percent to research, 50 percent to development, and 17 percent to diffusion activities.

CHAPTER IV

MEETING THE DEMANDS FOR R, D, AND D PERSONNEL

After the demands for personnel in the field of educational R, D, and D from 1965 to date had been determined an attempt was made to find out how the field had been responding to these demands. This was studied in relation to four sub-studies:

1. An analysis of the Title IV ESEA educational research training programs, including:

    a. an empirical survey of the project proposals of the USOE Title IV Research Training Branch.

    b. a review of other studies of the Title IV training programs.

2. A questionnaire survey of new personnel employed to fill positions in one new ESEA program - Title III.

3. A logical assessment of supply sources, other than Title IV training programs, which will affect the supply of R, D, and D personnel in education in future years.

4. A descriptive survey of the curricula for educational R, D, and D training in colleges and universities, with particular emphasis on the extent to which these curricula are attending to emerging R, D, and D roles; and a discussion of the impediments to mounting effective programs of R, D, and D training in schools and colleges of education.

Title IV ESEA Research Training Programs

The Elementary and Secondary Education Act of 1965 had, built into its authorization, a program which was intended to assist in meeting the demand for trained manpower in educational R, D, and D which would be created by the other authorized programs. Administratively, this support for R, D, and D training was organized initially into five sub-programs:

1. The Graduate Research Training Program formed the heart of the activities undertaken by the then designated Division of Research Training and Dissemination. Included were instructional programs to provide post-baccalaureate training leading to degrees or certificates up to and including the doctorate. Most, but not all, of these programs were to be administered directly by an institution of higher education. The locus of the program within an institution of higher education could be any school, college, or division of the university.

2. The Post-doctoral Research Training Program was institutionally based for the first year of operation; that is, institutions applied for support for post-doctoral training programs which they devised and administered. Individuals were recruited to and enrolled in these programs. For the past two years, the program has been one of individual competition. Researchers apply directly to

USOE for support of a post-doctoral year and make arrangements subsequently with one or more institutions at which they will be studying.

3. The Undergraduate Research Training Program, now defunct, was designed chiefly to recruit bright undergraduates to pursue educational research careers by providing them with early, brief exposure to the field. Only isolated instances arose where the program director intended the program to be a training ground for specific skills to be applied by the trainee in a work situation.

4. Program Development Grants, often but not always made in conjunction with a graduate training program grant, were designed (1) to strengthen the potential of an institution to offer effective R, D, and D training or (2) to provide time and manpower to plan a new program. No trainee support was involved in this program. The funds were designated chiefly to purchase professorial time which, in turn, was to be assumed in subsequent years by the local institution.

5. Institutes and Special Training Projects Program encompassed all training experiences in research sponsored by the Research Training branch of the Division and not covered by conventional academic designations, i.e., undergraduates, graduate, post-doctoral. The most typical training experience supported was the short term summer training institute.

A Three-Year Program-Funding History

A survey of training projects approved for support in FY '66 was conducted to ascertain (1) the number of trainees being prepared under each program, and (2) the roles for which they were being prepared (insofar as this could be ascertained from the stated project objectives) and the character of the proposed training.

The object of this search must be self-evident. The staff had hoped to super-impose the results of this survey, and projections for this program, on the demand projections from earlier chapters of this report. The magnitude of the output of R, D, and D personnel under the Title IV training programs, it was assumed, would provide an estimate of the balance which might be achieved between supply and demand for educational R, D, and D personnel a decade hence. However, as funding support for the program after FY '66 ($7.275 million) not only failed to increase significantly but actually diminished (to $6.5 million in FY '67 and $6.75 million in FY '68), it became evident that the Title IV R, D, and D training programs were not to be considered a response to the demands in the field. The pressure for new personnel cast against the minisule number of trainees made quantitative comparisons of the two almost irrelevant for manpower projection purposes.

In FY '66, the allocation to the various program components was as follows:[1]

TABLE 84. PROGRAM ALLOCATIONS FOR USOE EDUCATIONAL RESEARCH TRAINING IN FY '66[a]

	Undergraduate	Graduate	Postdoctoral	Program development	Institute and special project	Total
Number of Awards	13	87	12	28	36	176
Number of Trainees	197	788	41	--	1,635	2,661
Cost (in thousands)	$240	$4,525	$602	$563	$1,345	$7,275
Percent of Fiscal Resources Allocated	3.3	62.2	8.3	7.7	18.5	100.0

[a] Allocations for FY '66 (July 1, 1965-June 30, 1966) were used to support program activities for the school year 1966-1967. Thus, funds noted as allocated for FY '67 supported the program activities for 1967-1968 and funds designated as FY '68 were for the school year 1968-1969. The reader has become accustomed to a different baseline in examining the project support reported in Chapter III, where FY '66 funds supported projects for that fiscal year - 1965-1966.

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[1] "Educational Research Training Program," mimeographed report by John D. Colby to USOE Advisory Committee on Title IV training programs, dated February 9, 1967.

Each of the programs has fared differently as a consequence of the unexpected leveling of funding:

1. In The Graduate Research Training Program, no increase in funds simply resulted in cutting off entering classes in a typically three year program, beyond the 1966-1967 school year, as all the monies in FY '67 and FY '68 were required to support the entrants who began under FY '66 support. The overall productivity of the program was dropped from the initial projection of 788 per year by 1969 to roughly a third of that level. With the actual reduction in overall allocations, the percentage of expenditure within the branch for Graduate Research Training rose from approximately 60 percent in FY '66 to 80 percent in FY '68.

2. The character of the Post-doctoral Research Training Program, as noted earlier, was altered from institutional to individual competition. The actual funds expended were curtailed and the percentage of total program funds devoted to this sub-program was reduced from 8.3 percent in FY '66 to 5.4 percent by FY '68. Thirteen individual awards were made for the school year 1967-1968 at an approximate cost of $265,000. Twenty awards were made for the school year 1968-1969.

3. The Undergraduate Research Training Program has been terminated. The funds devoted to this activity were halved in FY '67 and dropped altogether in FY '68.

4. Funds allocated for the Program Development Grants Program have been declining steadily. Each of the original grants assumed that the institution receiving the grants would pick up the costs over a specified time period. The federal contribution has been phasing out, and no new grants have been initiated.

5. The only affect on the Institutes and Special Training Projects Program has been a small decline in funds and trainees. Along with Graduate Research Training this has been the program which USOE has elected to attempt to keep going. Since this program is typified by short-term study periods, it was possible to accept new trainees under FY '67 and FY '68 funds. In contrast with the Graduate Research Training, the funds expended in one year completed the work of a "class group" of trainees.

6. No new programs in New Program Dimensions have yet been initiated, but current (FY '69) program plans specify that commencing with the 1968-1969 school year the program will begin to support the development of curricular materials for R, D, and D training programs. This will be an effort to extend the impact of the program within the constraints of limited fiscal support.

Production of R, D, and D Personnel

In terms of the gross production of trained personnel to work in the educational R, D, and D community, there is little to report. The undergraduate program touched approximately 300 trainees before its demise but, as noted earlier, the objective of these brief training experiences was almost exclusively recruitment. The abortion of the strategy means that no long-range effect need be projected.

The program development grants had no trainees, and any effect of this effort will be pursued later in a discussion of the increase in research training centers.

To date, there have been some 50 participants in the post-doctoral program (this year, 1968-1969, there will be another 20). All of the recipients of individual awards were already producing researchers, and this was true of most of those who participated in the first-year program. The short-range impact of this effort (up to five years) is obviously directed toward qualitative rather than quantitative change. Over the long haul it might be argued that, as these participants become trainers, there might be some quantitative impact.

The real quantitative effect rests in the (1) Graduate Research Training and (2) the Institute and Special Training Project areas. In terms of the Graduate program, the production per year will be roughly 300 to 400. The stated dates of expected completion by candidates, based on an analysis of 1967 project proposals, were as follows:

Year	Number of Graduates
1967	138
1968	213
1969	386
1970+	51
Total	788

A little less than a quarter of these students were pursuing either a Master's or Specialist's degree. The remainder were doctoral candidates. The sub-doctoral programs repeat their production on a yearly or bi-yearly basis, while the doctoral program will average a full class every three years. Assuming a continuance of the present funding level, the productive output of the Graduate Research Training Program will be roughly as shown in Table 85.

The output of the Institute and Special Training Projects is somewhat more difficult to quantify in meaningful terms. If the total group of trainees reported by USOE were used, about 1,200 to 1,800 individuals per year would be added to the total; however, how they are being trained and for what they are being trained is not as clear as in the case of the graduate trainees. It is not unreasonable to assume in the latter case that a relatively high percentage of the doctoral candidates, at least, are inexperienced researchers being inducted into stable positions in the R, D, and D community.

TABLE 85. PRODUCTION OUTPUT OF THE GRADUATE RESEARCH TRAINING PROGRAM

Year	Sub-doctoral students	Doctoral students	Total
1967	140	--	140
1968	190	160	350
1969	140	300	440
1970	190	150	340
1971	140	160	300
1972	190	300	490
1973	140	150	290
1974	140	160	300

In the case of the Institutes there were two very different categories of awards. The most typical training experience was the 6 to 8 week summer institute (20 of the 36 awards). A substantial number, however, were of very short duration, usually a week or less, and involved such diverse activities as pre-sessions of The American Educational Research Association, a one-week training session on the Program Evaluation and Review Technique, and an orientation for raters of the first round of Title III projects.

For the purposes of quantitative estimates for this project, the short-term activities can be effectively ignored, because they either represented specific retraining experiences for individuals already counted in the R, D, and D manpower pool, or represented interventions so slight in impact that they could hardly be expected to modify the participant's behavior. Since these experiences accounted for over half (847) of the total participants claimed for the program, it might be well to defend this elimination by attention to several exemplars from the category:[2]

1. Training Program in the Use of Management Information Systems in Educational R and D Activities (100 participants). The participants were selected from among persons having responsibility for federally funded programs, staff of state education agencies, or personnel in regional laboratories, R and D centers, or ERIC centers. Although a few in the first category might not have been included in the R, D, and D community prior to their current assignment, this effort was still a specific retraining experience (PERT) for manpower already in the R, D, and D community and was not a source of new trained manpower.

2. Regional Meetings in Evaluation Research (360 participants). This activity was designed to train participants in initial evaluation of Title III projects.

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[2] These exemplars are summaries of 1966 Institute and Special Training projects prepared by the staff of this project from the actual proposals.

Legitimate as this may have been, the participants could hardly be considered an emerging R, D, and D manpower pool.

3. Workshop in Reading Research (100 participants). The participants were "anyone interested in reading research." Their one week experience was (1) to disseminate information on reading research, (2) to help them "read" statistical studies, and (3) to encourage them to participate in classroom research. The impact of this type of experience was judged to be so light that it could only be considered a generalized recruitment effort.

The Institute and Special Training Projects which were not eliminated covered 788 participants, most of whom would not normally be considered prior members of the educational R, D, and D community. Whether these institute programs did, in fact, provide them with the background to behave as productive members of this community is a matter which the reader can assess better for himself as the nature of the experience, the training agency, and the trainee are described more fully later. For the time being, in terms of gross program production, some 700 to 800 trainees per year are added as a manpower pool to the Graduate Research Training program.

Characteristics of the Training Programs

In attempting to describe the characteristics of the various Title IV training programs and the relationship of these programs to R, D, and D roles in education, they are discussed, where possible (primarily in Graduate Research Training), in relation to other empirical studies in this area. The characterizations of the existing programs are based on a project-by-project analysis of the approved programs for FY '66.

Post-doctoral Research Training. The general characteristics of the Post-Doctoral Research Training program are summarized in Table 86. The program can be typified as follows:

Those involved as trainees were drawn from the pool of research personnel already functioning in education, i.e., they should become better trained members of an extant pool rather than quantitative additions to the pool.

The program had no implications for new roles in educational D and D and little implication for diverse settings. Thirty-four of the 41 trainees were being prepared to work in higher education settings and all were being trained in programs designed to produce "Research" rather than "Development" or "Diffusion" personnel.[3]

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[3] The assignment of persons within categories was done on the basis of the stated objectives of the program, e.g., Project #2617, University of Minnesota, indicates that the program purpose is to train individuals to carry out institutional research in colleges and universities - consequently, these six trainees are classed in "College and University Administration Units - Gathering Operational and Planning Data."

TABLE 86. PARTICIPANTS IN TITLE IV-ESEA POST-DOCTORAL TRAINING PROGRAMS IN RESEARCH IN TERMS OF OCCUPATIONAL GOALS (TRAINING PERIOD, SCHOOL YEAR 1966-1967)[a]

Occupational Goals of Program Trainees	Institutional Setting						
	Institutions of higher education						
	Schools and colleges of education	Other behavioral and social science schools and departments	College and university administrative units	Private research institutes and agencies	Schools and school systems	State education agencies	Total
RESEARCH							
Conducting Basic Scientific Inquiry	3	3	-	-	-	-	6
Investigating Educationally Oriented Problems	16	6	-	1	4	2	29
Gathering Operational and Planning Data	--	-	6	-	-	-	6
DEVELOPMENT	--	-	-	-	-	-	--
DIFFUSION	--	-	-	-	-	-	--
TOTAL	19	9	6	1	4	2	41

[a] Location of sponsoring agencies: colleges and universities (including two affiliated with R and D centers), 7; private research agencies and institutes, 3; state education agency, 1; and inter-agency organization, 1; making a total of 12.

This was a high prestige institutional program. All seven of the awards were made to institutions of higher education which could be designated as "Productive Educational Research Centers."[4] Obviously the program was not being used to extend the number of research training centers available in institutions of higher education. However, there were five non-university training sites (i.e., American Institutes for Research, Center for Advanced Study in the Behavioral Sciences, National Merit Scholarship Corporation, Educational Testing Service, Oregon State System of Higher Education) where the potential for producing research personnel might have been enhanced had the program continued on an institutional basis.

Program Development. In FY '66 there were 28 program development awards at a cost of $563,000 (7.7 percent of the program's total allocation). The number of awards was held constant for the next two years, but the funds were reduced since the institutions were picking up their share of the supported positions.

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[4] Institutions so designated throughout this chapter met one or more of the following criteria: (a) They were the schools of education involved traditionally in research production or the production of researchers. (See page 111 Table 10, Chapter 2). (b) They were the site of a USOE R and D center. (c) They were the recipients in FY '67 of substantial USOE research support monies ($250,000+) other than funds for the support of research training.

Since no trainees were involved, the analysis of these projects was directed toward:

1. The type of institution to which the grant was made. Was this an effort to extend the number of "Productive Educational Research Centers"? Was it an effort to improve qualitatively those institutions already classified as producers? Was it an effort to extend their quantitative capacity to produce R, D, and D personnel?

2. The R, D, and D role envisioned for graduates from the program. Were the grants used to "shore-up" conventional programs or to enhance the capacity of institutions to take on the training of personnel for new roles?

The general characteristics of the program can be summarized as follows:

1. Median size of program development grants - $16,925.

2. Location of agencies awarded the 28 grants.

   a. All universities, 27 (educational research centers, 17 @ $17,812; others, 10 @ $15,000).

   b. State departments of education, 1.

3. Roles for which participants were to be trained (see Table 87).

   a. Research, 24.

   b. Development, 1.

   c. Diffusion, 3.

TABLE 87. PROFILE OF PROGRAM DEVELOPMENT AWARDS BY OCCUPATIONAL GOALS OF THE TRAINEES[a]

	Institutional Setting				
	Institutions of higher education				
	Schools and colleges of education	Other behavioral and social science schools and departments	College and university administrative units	Schools and school systems	Total
RESEARCH					
Conducting Basic Scientific Inquiry	--	2	--	--	2
Investigating Educationally Oriented Problems	13	2	--	5	20
Gathering Operational and Planning Data	--	--	1	1	2
DEVELOPMENT	1	--	--	--	1
DIFFUSION	2	--	--	1	3
TOTAL	16	4	1	7	28

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[a] In addition to analyzing the stated objectives of the program development proposal, the objectives of the training program supported by the development grant were also taken into account in the classification.

The program can be typified as follows:

The awards were so small that they would support roughly the addition of one faculty member. To designate them as program development grants which might markedly affect the future of research training for education in most institutions was misleading.

Since the grants were designed to be tied into Graduate Research Training Programs, their impact on the quantity of R, D, and D personnel can be assessed with reasonable accuracy by examining the operating graduate training programs.

No single strategy for the program development grants emerged from the awards which were made. Most (about two thirds) were made to "Productive Educational Research Centers." Ten institutions without a history of involvement in educational research training also received support. Only one award was made outside the college and university category.

Most of the stated objectives for all participating institutions indicated simply that the grant was designed to upgrade the quality of the research training program. Only one institution specifically noted that the grant would place them in a position where they could increase markedly the quantitative production of R, D, and D personnel.

Despite the fact that program grants might well have been viewed as a vehicle to direct attention to new R, D, and D roles in education, only six of the 28 programs appeared to have this objective. They were development grants for programs designed to train:

1. Evaluators (defined as product researchers)
2. Indexers in educational documentation[5]
3. Administrators of educational research information systems
4. Institutional researchers in higher education
5. State and local education agency researchers

Graduate Research Training. This is the one aspect of the Title IV ESEA training programs in research which has been examined carefully by other investigators. Data obtained by Sieber[6] and Di Lorenzo[7] have been added to the proposal survey conducted by the staff of this project in detailing the characteristics of the Graduate Research

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[5] This was the single example of a program development grant designed to support a course content improvement activity. According to the current program plans, this type of award will be made more frequently in the future.

[6] Sieber, Sam D., Analysis of USOE Research Training Programs, 1966-67, Cooperative Research Project No. 7-8315, Bureau of Applied Social Research, Columbia University, New York City, 1968, 101 pp.

[7] Di Lorenzo, Louis T., Appraisal of ESEA Title IV Graduate Research Training Programs, New York State Education Department, Albany, New York, June 15, 1967 (Mimeographed Special Project Memorandum), 17 pp.

Training Programs. To avoid needless repetition in citations and footnotes, the following general description of the data gathered by these two investigators is offered:

Sieber's report covered the activities of the program for its first year of operation (1966-1967). It was based on an analysis of the proposals and trainee report forms from the Educational Research Training Branch and emphasized an analysis of the Graduate programs, "because these are the programs that promise to contribute most significantly to the next generation of educational researchers."[8]

Di Lorenzo's "preliminary" appraisal of the graduate training programs was based upon (1) study of the 85 funded programs, (2) analysis of the ratings and comments of those who reviewed the proposals, and (3) visits to a group of the programs and interviews with directors, staff members, and trainees. Most of the appraisal is directed toward assessing the extent to which the graduate training programs were fulfilling the original intent expressed for research training programs under ESEA Title IV.

Since the Graduate Research Training Programs (1) have been allocated from 60%-80% of the available funds for research training, (2) are the only obvious source of additional stable members in the educational R, D, and D community, and (3) represent an intervention of sufficient power to anticipate behavioral change in participants, it is hardly surprising that those interested in the future of educational R, D, and D have concentrated on examining these programs. Having already dealt with the question of gross quantitative production, this section will look at the following questions about these Graduate Research Training Programs:

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[8] Sieber, op. cit., p. 10.

1. What agencies are engaged in the training? What effect does the program seem to have had on the emergence of centers capable of training R, D, and D personnel? How do the number of trainees and agencies compare with the status picture of research training in education pre-ESEA?

2. For what roles are the trainees being trained? To what extent is the program directing its attention to underdeveloped roles ranging from the basic inquirer, on the one hand, to the D and D specialist on the other?

The general characteristics of the Graduate Research Training Programs may be summarized as:

1. Sponsoring agencies
    a. schools or departments of education, 78 percent
    b. local or state school systems, 11 percent
    c. liberal arts and science departments, 6 percent
    d. other settings, 5 percent

2. Length of the instructional program and number of students

a. Master's and specialized degrees, 1 to 2 years (175 students)

b. doctorate, 2 to 4 years (543 students)

3. Proportion of participants pursuing various occupational goals (see Table 88)

a. research, 91.6 percent

b. development and diffusion, 6.7 percent

c. miscellaneous, 1.7 percent

Sieber noted that "the USOE Graduate Training Programs are being conducted in settings of professional education."[9] It was true that nine of ten of them were conducted in such settings and, more specifically, that four of five of them were located in institutions of higher education in schools or departments of education.

Equally true, and anticipated, was the fact that the programs were located at institutions which were already centers for producing researchers in education. Sieber pointed out that "56 percent of the institutions with _special_ (i.e., research training) programs in 1964-1965 now have USOE programs; . . . and only 32 percent of those where no program existed have such programs today."[10]

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[9] _Ibid_. p. 14.

[10] _Ibid_., p. 17.

TABLE 88. PARTICIPANTS IN TITLE IV-ESEA GRADUATE RESEARCH TRAINING PROGRAMS INITIATED IN FY '66 BY OCCUPATIONAL GOALS[a]

Occupational Goals of Program Trainees[b]	Number of Trainees	Percentage of Total	Percentage of doctoral trainees	Percentage of sub-doctoral trainees
BASIC RESEARCHER (typically prepared outside a school or department of education for service in a college or university liberal arts or behavioral science department)	42	5.8	7.7	0.0
RESEARCH SPECIALIST FOR PUBLIC SCHOOLS				
Doctoral level program	38	24.1	7.0	0.0
Sub-doctoral level program	135		---	77.1
RESEARCH SPECIALIST IN SUBJECT AREA (e.g., science education, language arts education, etc.)	87	12.1	12.3	11.4
RESEARCHER IN SPECIALIZED EDUCATION FIELDS				
Educational administration	21	12.4	16.4	0.0
Educational psychology	32			
History and philosophy of education	28			
Research methodology	8			
GENERAL EDUCATIONAL RESEARCH TRAINING (typically prepared in a school or department of education - usually for service in college or university setting)	263	36.6	48.4	0.0

TABLE 88 (continued)

Occupational Goals of Program Trainees[b]	Number of Trainees	Percentage of Total	Percentage of doctoral trainees	Percentage of sub-doctoral trainees
INSTITUTIONAL RESEARCH IN HIGHER EDUCATION	4	.6	.7	0.0
NEWER D AND D ROLES				
Curriculum development specialist	4	6.7	5.2	0.0
Information storage and retrieval	4			0.0
Product researcher	5			0.0
D and D specialist	15			0.0
Technological support personnel	20			11.4
MISCELLANEOUS	12	1.7	2.2	0.0
TOTAL	718	100.0	99.9	99.9

[a] This chart was based on a review of 79 of the 85 proposals approved in FY '66 and covers the programs in which 718 of the 788 trainees were enrolled. The remaining six proposals were either unavailable or unusable at the time the data were gathered.

[b] This characterization was obtained by classifying the role of trainees in terms of the stated objectives of each program.

Among the 53 institutions participating in the Graduate Research Training Program:

Twelve of the 15 institutions identified in Table 10, Chapter 2, as traditional producers of research or researchers were represented.

Eight of the nine institutions housing USOE R and D centers were represented.

Eleven of the participant institutions which fell in neither of the foregoing categories were centers of research production for USOE receiving $250,000 or more in FY '67 in research support other than for the training program itself.

To summarize briefly, then, the typical agency for training in the Graduate Research Training Program was a school or department of education located in a university already noted as a producer of research or researchers in education. The support went, as one might expect, where the training programs were already located. DiLorenzo concluded after visiting nine of the institutions which purportedly had innovative programs that these nine were "operationally the ongoing doctoral programs of the sponsoring universities. Many of the trainees had been doctoral students prior to the initiation of the training programs; they are now pursuing previously chosen courses of study with the support of federal grants."[11]

These characterizations, however, still leave open the question of whether the quantitative production of researchers in these research centers was affected by the Title IV training program. The answer is "yes" and "no." The quantitative production would have been affected (in the magnitude of two to three) had the institutions been able to take on new entering classes in the 1967-1968 and 1968-1969 school years. If the production of researchers in these institutions in 1952-1961, as noted by Bargar,[12] is updated to match the increase in doctorates in education generally between 1962 and 1968, the 26 "research center" institutions would have produced approximately 150 researchers per year without the federal support. They will, in fact, be producing roughly 125 to 175 graduates under the Title IV program. Added to this number, of course, will be some (circa 50 to 75) not identified as program fellows who will end up as productive members of the educational R, D and D community. If these institutions had been allowed to take on new trainees they would have doubled or tripled their normal output. In conclusion, then, with the present operating base the Title IV Graduate Training Program has little effect on the production of researchers in "research center" type institutions.

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[11] DiLorenzo, op. cit., p. 12.

[12] Bargar, Robert; Guba, Egon; and Okorodudu, Corahann, Development of a National Register of Educational Researchers, The Ohio State University Research Foundation, Columbus, Ohio, 1965, 139 pp.

The program attempted to extend the number of producing centers with awards to 27 institutions which had not been typical producers of R, D, and D personnel in education. Of the 718 trainees in the project sample, 374 were enrolled in such institutions. Nearly half of this total (165) were sub-doctoral program candidates and all of this group of 165 were preparing for service in institutions other than colleges and universities. Twelve of the institutions and 138 of the trainees, however, were represented in the category "General Educational Research Training." These were doctoral programs directed toward the production of researchers to work in higher education settings. It is difficult to imagine that the present level of support (about five trainees per year) can go far toward developing these sites as research training centers; but it is true that these institutions would have produced few researchers without the stimulation of federal monies. They are now producing 165 sub-doctoral graduates and 50 to 75 doctoral graduates a year who have some training in educational R, D, and D.

There was considerable evidence to support the contention that the training programs reinforced existing training patterns in educational research. Depending upon one's prejudice, one may state the conclusion in different terms, for example:

DiLorenzo pointed out "the infrequency of new courses or innovative training plans geared to the ultimate goal of applying research techniques in the solution of school problems. The dissemination and development roles of the educational researcher, were, for the most part, completely overlooked in the program plans.[13] The training programs are university-oriented with the majority at the doctoral level. Many of the trainees are thinking in terms of college positions. There is little or no evidence among them of interest in the application of their research training in school situations.[14] The training programs (have been) planned, executed, and evaluated with only modest reference to recent changes in the educational field."[15]

Sieber noted that "the doctoral recipients from the USOE training programs will reproduce the distribution of research fields in schools of education found 10 years earlier."[16] His concern for the underrepresentation of academic researchers led to the conclusion that "it was predictable that schools of education would be the first institutions to apply for USOE training funds.[17] It might therefore (in view of lack of funds for expansion) be advisable to eliminate some of the present training programs that show less vitality in order to make room for applicants from the liberal arts."[18]

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[13] DiLorenzo, op. cit., p. 9.

[14] Ibid., p. 13.

[15] Ibid., p. 14.

[16] Sieber, op. cit., p. 74.

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Sieber and DiLorenzo are both right, as the figures in Table 88 affirm. The Graduate Research Training Program "told it as it was." There were only a handful of trainees (42) spread across all the academic areas of concern to Sieber (e.g., 18 in sociology, 13 in social psychology, and 5 in psychology). Newer D and D roles in educational research were so entirely ignored that DiLorenzo was quite justified in viewing the situation "with alarm." The content of the programs were highly conventional, as will be illustrated in the broader survey of research training to be presented later in this chapter. The product of the Graduate Research Training Program simply looked like the research personnel being produced in education prior to its appearance on the scene and there is no point in belaboring the issue further. The program has had no substantial effect on the field either quantitatively or qualitatively.

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[17] _Ibid_., p. 75.

[18] _Ibid_.

Before turning to the Institutes and Special Projects an editorial opinion may be in order. Apologists for the impact (or lack of impact) of the Graduate Research Training Program have several arguments ready to "explain" the state of affairs. They note that:

The money had to go where the programs were; or, as Sieber pointed out, it was predictable that the schools of education and those with extant training programs would get there first and take over the initial funds.

The program really never had a chance to fulfill its mission, since funds were cut off so quickly after the initial round.

Something is better than nothing. At least there is some explicit attention now being given to research training in education.

This is really an absurd state of affairs if the notion of educational planning has any meaning for the field. If it were possible to predict ahead of time, as everyone seemed able to do, that this pattern of funding would result in the conclusion reached, why should not the pattern have been altered? If the demand for basic researchers in the academic disciplines is a priority need, there is no reason why the program development grants could not have been used to stimulate research training activity in these sites. If the demand for new D and D personnel is overwhelming, as it appears to be, there is no reason why course content development projects, consortia of concerned and involved agencies, special internships, etc., directed toward meeting this demand, could not have been supported. If cutting off the program's funds destroyed the essential effect of the program, the USOE personnel who made this decision internally must be faulted for the impact of the decision on the staffing of the programs to which the funds were diverted. And something may be considerably worse than nothing if it re-affirms a situation which was undesirable in the first instance. The USOE never provided a professional staff to support this program that was large enough to do anything other than process routinely the first proposals it received. There was no time to be concerned with a strategy for changing the picture of R, D, and D training in education. Fatalistically, the program proceeded to perform, inadequately shielded by the educationists constant plaint that "I knew it would turn out that way, but what else could I do?" Plan, perhaps.

Institutes and Special Training Projects. The reader will recall that a number of projects were dropped from this category for the purpose of the earlier quantitative projection. They have been re-inserted immediately below and in Table 89 so that a full characterization can be made of the FY '66 grants under this program.

The characteristics of the (1) summer institutes, (2) short-term institutes, and (3) other forms of institutes supported by this program may be summarized as follows:

1. length of the instructional program and number of trainees[19]

   a. summer institutes, six to eight weeks (625 trainees)

   b. short-term institutes, three weeks or less (847 trainees)

   c. other institutes, four weeks to an academic year (160 trainees)

2. number of awards and level of support

   a. summer institutes, 20 (ranging from $23,721 to $69,973 with a median of $47,500)

   b. short-term institutes, 11 (ranging from $4,914 to $88,692 with a median of $9,735)

   c. other institutes, 5 (ranging from $12,447 to $59,227 with a median of $32,400)

3. location of the sponsoring agencies

   a. summer institutes; colleges or universities (19) and private research institutes (1), for a total of 20

   b. short-term institutes; colleges or universities (4), state departments of education (4), professional associations (2), and private research institutes (1), for a total of 11

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[19] USOE fiscal records (see Table 84) indicate a total of 1,635 trainees but the breakdown above indicates there were 1,632 trainees.

c. other institutes; colleges or universities (4) and state departments of education (1), for a total of five

4. occupational goals for which institutes prepared trainees (see Table 89)[20]

a. research, 25 institutes

b. development, 8 institutes

c. diffusion, 2 institutes

If Title III of the ESEA could be characterized as the "Public School Title," certainly the Institute and Special Training Project unit can be typified as the "Public School Training Program." Twenty-three of the 35 awards were made to train personnel for subsequent service in the public school setting (see Table 89). This included 17 of the 20 Summer Institute type, which represented the largest commitment of time and money. Interestingly enough, however, the sponsoring agency was still chiefly the college or university (19 of the 20 summer institutes).

Attention to agencies other than schools and school systems was so sporadic in the Institute program that it can almost be ignored. The one activity not designed for school systems which seems to have been quite successful,

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[20] One "other institute" project was eliminated, since it did not appear to qualify as a training activity.

TABLE 89. PROFILE OF INSTITUTE AND SPECIAL TRAINING PROJECTS PROGRAM BY TYPE OF PROGRAM AND OCCUPATIONAL GOAL FOR WHICH PARTICIPANTS WERE TO BE TRAINED[a]

	Institutional Setting						
	Institutions of Higher Education						
Occupational Goals of Program Trainees	Schools of education	Other behavioral science departments	College adminis- tration units	Schools and school systems	State education agencies	Inter-agency organizations	Total
RESEARCH							
Basic Scientific Inquiry		1-A	1-C				2
Investigating Educational Problems	1-A 3-B			7-A 1-B	1-B	1-B	14
Gathering Operational and Planning Data			1-A	5-A 1-C	1-B 1-C		9
DEVELOPMENT							
Inventing and Engineering Solutions				2-A 1-C			3

Table 89 (continued)

Occupational Goals of Program Trainees	Institutional Setting						Total
	Institutions of Higher Education						
	Schools of education	Other behavioral science departments	College adminis-tration units	Schools and school systems	State education agencies	Inter-agency organizations	
Testing and evaluating solutions				2-A 1-B 1-C	1-B		5
DIFFUSION				1-A 1-B			2
TOTAL	4	1	2	23	4	1	35

[a] In the body of the Table, the letter "A" indicates summer institutes, "B" indicates short-term institutes, and "C" indicates other institutes.

and is being continued, is the AERA pre-session training program designed chiefly to foster qualitative improvement in the educational research community.

It is surprising how little attention was paid in the proposal objectives to newer D and D roles. Only 10 projects paid explicit attention to development or diffusion. Most of them were concerned with upgrading the technical skills of public school directors of research or with improving conventional research skills in public school employees. No proposal mentioned course content improvement activities or information and retrieval systems or conducting demonstrations. Only five of the 35 proposals expressed direct concern for problems of evaluation in ESEA Title I or Title III projects or centers.

An analysis of the colleges and universities involved in the Institute and Special Training Projects was also revealing. In contrast with the Graduate Research Training Program where "research center" institutions were well represented, 20 of the 27 institutions conducting special projects or institutes met none of the criteria set up for this designation. Apparently, the Graduate Training (and Program Development) awards represented the type of fiscal rewards which the prestige institutions sought in exchange for their time.

With a warning to the reader about editorializing, the staff has been impressed with the fact that:

Whenever the training of non-university personnel is involved, the assumption seems to be made that the training period time can be reduced sharply, e.g., predominance of public school traineeships in the sub-doctoral graduate programs and the special project categories.

The training of non-university personnel does not seem to require the "high level" talents of professorial staff in "research center" institutions.

The training offered is chiefly skill training in conventional research techniques. The assumption seems to be that it would be good for public school personnel if they knew how to conduct conventional research studies in their own setting.

Despite the fact that the field is almost barren of relevant instructional materials on research in operating settings (e.g., product or quality-control research, experimental design, etc.), instruction of this sort can be trusted to institutions which are relative neophytes in the research field.

Frankly, the Institute and Special Training Project program seems to have missed its mark. The limited resources were dispersed across so broad a spectrum of interests that no focus seems to have been achieved. The best that can be said is that an individual effort here and there was a "good thing to do" (e.g., the AERA pre-sessions). No cadre of trained personnel has emerged from the effort, nor does any seem likely, given the present level of funding and the current non-strategy of granting awards.

Summary

The curtailment of funds for ESEA Title IV research training programs reduced the quantitative impact of the programs on the supply of R, D, and D personnel in education to a point where it was not profitable to attempt to relate this miniscule production to substantial demands.

Awards were made chiefly to previously operating programs, and there seems to have been little impact on change in the field in terms of the type of training or trainee. Title IV ESEA will, under its present operating pattern, reinforce the field of educational research as it has existed for the past decade.

New centers for research training have not emerged as a result of the awards granted to date; nor has there been any major effect on the quantitative production of traditional training centers.

New roles for researchers in education have been literally ignored whether the concern is expressed in terms of academic researchers (non-educationists) or development and diffusion personnel.

Meeting the Demand for ESEA Title III Personnel

Since it seemed apparent to the project staff early in the study that the demand for R, D, and D personnel to fill positions on ESEA programs would quickly outstrip any extant supply sources, a sub-survey was undertaken to determine what personnel were being used to fill such positions. Title III projects were chosen to deal with the question, "Where do they come from?" since these projects represented (1) an institutional setting in which there had been a relatively small number of R, D, and D personnel prior to ESEA, and (2) project activities which should require development and diffusion personnel--role types which were in short supply.

This combination of unpromising circumstances seemed to be just right for examining the question of where they come from--a large, sudden inflow of money; an agency which had not been a center of R, D, and D activity; an activity for which personnel in education had not been trained--and how one segment of the educationist community geared itself up to supply an inordinate demand for which normal supply channels were inadequate.

The Survey Sample

The Title III centers surveyed were drawn from the 1,145 projects described in Pacesetters in Innovation, volume 1 (nos. 1-4) and volume 2 (no. 1).[21] Volume 1 included all projects approved from the first submission date, November 10, 1965, through July 31, 1966. Volume 2 included approved projects through December 31, 1966. Thus, this total of 1,145 projects was inclusive of the first year of Title III funding activity.

From the summary descriptions of the projects, the staff attempted to sort out those which had, as their primary or sole objective, the provision of supplementary services in a school district, since this was not considered to fall within the definition of R, D, and D as employed in this project. This eliminated 790 of the 1,145 described projects. Another 57 were eliminated because the descriptions offered were inadequate to classify the project clearly as either a service or an R, D, and D activity. The following brief questionnaire was then distributed to the remaining 298 center directors. One such form (shown below) was available for each staff member employed on a regular basis (arbitrarily defined as more than two-thirds time to eliminate transient consultants).

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[21] Pacesetters in Innovation, U. S. Department of Health, Education and Welfare, Office of Education, Washington, D. C., vol. 1, no. 1, February, 1966; vol. 1, no. 2, April, 1966; vol. 1, no. 3, July, 1966; vol. 1, no. 4, September, 1966; vol. 2, no. 1, May, 1967.

PROFESSIONAL STAFF MEMBER NO:1 (more than two-thirds time)

1. Title of position ______________________
2. B.A. - date received ______________________
   Major ______________________
   Minor ______________________
3. Master's degree - date received ______________
   Major ______________________
   Minor ______________________
4. Doctor's degree - date received ______________
   Major ______________________
   Minor ______________________
5. Employment Record (Immediate Previous Positions)

	Employing Agency	Title	Dates
a.			
b.			

Usable responses were received from 137 centers involving 579 professional staff members. No special effort was made to pursue the non-respondent group, since no apparent systematic bias seemed to exist which would affect the survey results for the purposes of this study.

A Characterization of Title III R, D, and D Personnel

For the group as a whole, the staff of Title III centers can be characterized as follows:

1. Age: 32-33
2. Education: Master's degree
3. Major: Teaching Field, General Education, or Educational Administration
4. Most recent position: Public school employment as teacher, administrator, or special service worker, e.g., guidance counselor

The general answer to the question of where the staff came from is clear. The Title III centers were staffed by personnel from within the district where the center was located; and they seem to have had no special formal training, other than that characteristic of regular school district personnel, to support the activities in which they were engaged.

Tables 90 and 91 summarize the formal training backgrounds of the staff members. More than 8½ of 10 had no degree or certificate beyond the Master's level and only 1 of 10 held the doctorate. The distribution of major fields for the highest degree shows that well over 80 percent have majors that would be expected among a group of teachers, administrators, counselors. Table 92 is revealing in relation to the personnel sources tapped by the centers to fill their positions. Three hundred ninety-seven of the 539 cases (75 percent) on whom data were available reported that the last position which they held prior to working on the Title III project had been as a regular school employee. The overwhelming number of these, where data were available, reported their previous public school employment to have been in the same district in which the project was located.

Within the total group there were, undoubtedly, individuals trained to a greater or lesser extent in R, D, and D functions. But the number so trained turned out to be miniscule as attempts were made to identify them in the sample. For example, if one attempted to identify "pure" cases of conventional researchers he might select high productive major fields of study (e.g., sociology, psychology,

TABLE 90. HIGHEST DEGREE HELD BY 579 TITLE III CENTER EMPLOYEES

Degree	Number	Percent
Bachelor's	142	24.7
Master's	354	61.1
Specialist	14	2.4
Doctorate	63	10.9
No degree	6	1.0
TOTAL	579	100.1

TABLE 91. MAJOR IN HIGHEST DEGREE HELD BY 579 TITLE III CENTER EMPLOYEES

Major Field	Number	Percent
Teaching Field	156	26.9
General Education	127	21.9
Educational Administration	122	21.1
Guidance	33	5.7
Special Education	33	5.7
Psychology	24	4.1
Curriculum and Instruction	16	2.8
Educational Media	14	2.4
Sociology	8	1.4
Educational Psychology	7	1.2
Other	39	6.7
TOTAL	579	99.9

TABLE 92. MOST RECENT POSITION HELD BY 579 TITLE III CENTER EMPLOYEES

Position	Number	Percent
Public Schools	397	68.6
Classroom Teaching	173	29.9
Administration	129	22.3
Special Services	95	16.4
Colleges and Universities	57	9.8
Federal Agencies	35	6.0
Business and Industry	20	3.5
State Agencies	14	2.4
No Data	40	6.9
Other	16	2.8
TOTAL	579	100.0

educational psychology, computer science, etc.), a doctorate, and recent employment in a college or university. This particular sort produced five cases, or less than one percent of the sample. Dropping the college and university employment, the number increased to only nine. Coincidentally, six of these nine cases were project directors so that a higher proportion of leadership personnel had research or research-related training--a point which will be pursued further in the next sub-section of the report.

Looser definitions of R, D, and D preparation did unearth more cases. Nearly 11 percent of the sample held the doctorate. And of this group, twenty-three were employed in college and university settings in their most recent position. As a matter of fact, slightly less than half of the doctorate group was drawn from the public school setting (31 of 63) compared to nearly 70 percent of the total sample.

Leadership Personnel on Title III Projects

There was an observable difference between the characteristics of persons designated as chief project administrators and the staffs of Title III projects as a whole. Tables 93, 94, and 95 summarize the data on project directors. The level of training for these 117 directors was significantly higher than the training of their staffs. Nearly 25 percent of the group held the doctorate, and less than 7 percent failed to hold at least a Master's degree. The major in the highest degree was more likely to be educational administration (40.2 percent) and the group was twice as likely as the total group to be drawn from public school administration (41.9 percent) and colleges and universities (16.2 percent). As a matter of fact, of those in the total sample recruited from colleges and universities, a third (19 of 57) were employed as project directors.

Despite the obvious advantages in R, D, and D training and experience accruing to the director's position, Tables 93-95 still indicate that the group could hardly be typified as having been trained (formally or through

TABLE 93. HIGHEST DEGREE HELD BY DIRECTORS OF TITLE III PROJECTS

Degree	Number	Percent
Bachelor's	8	6.8
Master's	76	65.0
Specialist	6	5.1
Doctorate	27	23.1
TOTAL	117	100.0

TABLE 94. MAJOR IN HIGHEST DEGREE HELD BY DIRECTORS OF TITLE III PROJECTS

Major Field	Number	Percent
Educational Administration	47	40.2
Teaching Field	23	19.7
General Education	21	17.9
Curriculum and Instruction	7	6.0
Other	19	16.2
TOTAL	117	100.0

TABLE 95. MOST RECENT POSITION HELD BY DIRECTORS OF TITLE III PROJECTS

Position	Number	Percent
Public Schools	86	73.6
Administration	49	41.9
Special Services	23	19.7
Classroom Teaching	14	12.0
Colleges and Universities	19	16.2
Federal Agencies	6	5.1
Other	6	5.1
TOTAL	117	100.0

experience) for their assignments. The typical director had Master's level training, was drawn from the ranks of public school employment where he was probably a school administrator, and took his highest degree work to prepare himself as a public school administrator.

R, D, and D Roles in Title III Centers

An analysis of titles employed in the Title III centers is revealing in terms of the activity and development of the centers at the time of the survey (Spring, 1967). A very large portion of the total personnel pool was going into general project administration (197 of 579 positions). This tends to be explained away by the fact that the work of 64 percent of the centers surveyed was supported by planning rather than operational grants and consequently had smaller staffs with a large proportion designated as project directors.

The remainder were classified by designated titles as follows:

Title	Number
Evaluation and Specialized Research Personnel	29
Technological Support Personnel (Media and Materials)	50
Operating Personnel (Teachers)	71
Specialists--Pupil Personnel Services	75
Specialists--Subject Matter Fields	67
Specialists--General Curriculum	26
New Roles--D and D Titles	18
Non-classifiable	46

Using the classification of functional emphases in the change process employed in this study, it would appear that almost none of the personnel needed by the Title III centers could be classified as research personnel. The number of operating personnel, both those designated as teachers and those designated as specialists, leads to the conclusion that many of the projects were designed to "demonstrate the effectiveness of solutions and programs." This is further affirmed by the number of individuals designated as media and materials specialists. This might be affirmed, also, by the paucity of evaluation personnel. This figure undoubtedly reflects the fact that the staffing came from extant professionals in the district and that few evaluation or research specialists were available to be tapped.

It is interesting to note that the new terminology of D and D permeated the staffing patterns and elicited some titles which may provide a clue to emerging demands for trained personnel; for example, assistant director for development, chief engineer, coordinator of dissemination (dissemination specialist, dissemination director), education information specialist (information retrieval specialist), program developer.

Some General Observations on Title III Staffs

Several sub-analyses revealed characteristics of the staffs that are worth mentioning:

1. The reservoir of R, D, and D personnel in colleges and universities was hardly disturbed by the Title III staffing efforts. Of the 57 who reported their last employment as "college and university," only 23 held the doctorate. It seems reasonable to assume that the other 34, at least, were not major research producers in their university setting.

2. The group designated as Evaluation and Specialized Research Personnel were, in fact, less specialized and expert than their job titles might indicate. They were predominately trained at the Master's level or below (23 of 29) and, although better trained than staff groups generally, they fell significantly below the director's category in level of training.

3. No individual in the Operating Personnel--Teachers category had a degree beyond the Master's and,

with rare exceptions (11), this was also true of the three "Specialists" categories. These 239 cases looked almost identical to regularly employed school district teaching and special service personnel.

4. The "New Roles--D and D Titles" category showed nothing in training or experience which would in any way distinguish it from other staff categories in the Title III centers.

Summary

The ESEA Title III centers which appeared to be mounting R, D, and D programs were staffed, for the most part, by professionals already available to the district because they were currently employed by the district as school administrators, teachers, or special service personnel. A relatively large proportion of the staff time appeared to be devoted to program operations, and the qualifications sought were those of the master practitioner. These centers placed no substantial drain on personnel pools outside the school districts, and consequently there were few individuals assigned to such tasks as evaluation, research, and new specialized D and D roles. Leadership in the centers was drawn chiefly from leadership (administrators) within the school district.

This analysis of staffing under one of the new ESEA programs seems to point to two conclusions:

1. The vacuum created by demands far beyond the field's ability to supply will be filled with whatever leadership talent is available, whether or not that talent has any special qualifications for the new assignment of responsibilities.

2. The projects and programs supported by new funding efforts will take on the characteristics of the personnel available to the agencies to staff the projects. If operating personnel are most readily available in schools, demonstrations will be preeminent activities. If developers and/or evaluators are hard to come by, few projects will be so designed.

Supply Sources - An Assessment

The Title IV research training programs and the training output of other institutions of higher education producing research personnel for education in their regular doctoral program are obviously not the total supply source for educational R, D, and D personnel in education. Individuals who are currently not enrolled in any program which could be labeled "research training" will become productive members of the educational R, D, and D community in five to ten years. R, D, and D projects and programs are currently engaged in training their own personnel, regardless of the academic background of these personnel.

Every successful course content improvement program has had the experience of building its own developers and diffusers while building its new curriculum. Every educational laboratory is going through the same experience. The Title III centers have obviously adjusted their demands to fit their supply source but, in the process, they have also made adjustments in their personnel to fit their demands. As R, D, and D funds become available to agents and institutions which have not previously been engaged in research in education, it is reasonable to assume that personnel from these agencies will become a part of the manpower pool, just as, for example, academicians became developers under the stimulus of the National Science Foundation's Course Content Improvement Program.

As funds to support the Title IV research training program were curtailed, rationalizations to justify this reduction began to emerge. USOE administrators began to point out that the expenditures of the agency for research training were not restricted to the training programs *per se*. Associate Commissioner Bright, for example, in discussing the purposes of the small contract program of the Bureau of Research, pointed out that one of its three aims was "the support of graduate students."[22] USOE budget documents began to carry a separate line for training expenditures under such programs as the educational laboratories, the R and D centers, and the Division of Comprehensive and Vocational Education Research. Indeed, these agencies do staff many of their functions with graduate assistants; for example, in 1967 the nine R and D Centers reported over 300 graduate assistants affiliated full- or part-time with their programs. Across all USOE R, D, and D programs in FY '66, based on the projects sampled and adjusted to the population of USOE projects, there were approximately 1,250 participating graduate or research assistants.[23] For obvious reasons, those who could be classified as trainees are predominately in such programs as the R and D centers, which are located in colleges and universities rather than in the Title III centers and the educational laboratories. However, by January, 1968, an analysis of laboratory employment of individuals designated as research assistants reported 82 such individuals spread among the 20 laboratories.

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[22] *Educational Researcher*, Newsletter of The American Educational Research Association, vol. 19, no. 2, 1968, Washington, D.C., p. 2.

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[23] Based on the assumption that a three-year average tenure for doctoral students, provided that all these graduate and research assistants were doctoral students, the yearly output of individuals with one or more years of research experience would be about 400.

An Inventory of Sources

Since no absolute boundaries can be drawn around a single program to provide one number which will represent the supply total for a given year, there is the problem of placing the range of sources in perspective so that they can be logically assessed. In breaking out the supply components for logical examination, three general headings have been used--populations, tactics, and strategies.

Populations.[24] The most familiar way to talk about the problem of supply is the identification of gross population groups which are, or potentially could be, tapped to fill certain positions. All the accumulated evidence on the educational R, D, and D community indicates that the source which has been most fully tapped is the male educationist who is generally trained in educational psychology, has completed study for the doctorate in a college or university, and is somewhere between the ages of 30 and 40. His vocational placement has generally led him back to a school, college, or department of education where he proceeds in his educational research career on a part-time basis engaged in research "investigating educationally oriented problems." This leaves a number of populations untouched but not over-looked in the literature.

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[24] An effort mounted by the project staff to assess empirically manpower pools susceptible to recruitment efforts is reported completely in Appendix F--A Re-analysis of Normative Data from the "National Register of Educational Researchers:" Career Patterns of Researchers in Education With Implications for Recruitment, by Blaine R. Worthen. The limitations of the "intact data" with which the researcher was working prevented a comprehensive analysis of recruitment pools, and, of course, the sample was a pre-ESEA research community which reflected more stability than would have been optimally desirable in assessing a field in transition. Consequently, the data are used in this section on "Populations" to support an essentially logical assessment of the situation rather than being used as the basis for the section. The reader is referred to the complete report, however, not only in support of this section, but because (a) it provides a revealing and singular picture of "where they came from" pre-ESEA, and (b) the re-analysis also provided interesting and somewhat anomalous data on the research assistantship in education.

1. Women. The Worthen sample (Appendix F-Table 100) included 89 percent men. Sieber observed that 73 percent of the graduate trainees and 86 percent of the researchers-at-large were male. This caused him to observe that "the largest and most easily identified pool of recruits to educational research is comprised of women."[25]

2. Operating educationists. Obviously, in a predominately feminine profession such as teaching, if women are underrepresented in educational R, D, and D, so are teachers and guidance counselors and school psychologists and any other category of operating personnel in the public schools. This is the group to be retrained that is of greatest interest to DiLorenzo[26] and is the reason that

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[25] Sieber, *op. cit.*, p. 40.

[26] DiLorenzo, *op. cit.*

he lamented the conventional nature of the training programs and trainees which ignored this intra-professional pool of talent. The Worthen career patterns study emphasized strongly that the public school teacher category was the predominant recruitment pool available to meet new demands for R, D, and D personnel in education. He noted:

> Public school teachers are not only the largest long-range recruitment pool identified by this analysis, but they also represent by far the largest extant manpower pool in education. All things considered, teachers are probably the most viable existing pool (excepting undergraduate students) for long-range recruiting of R, D, and D personnel. Indeed, the public school teaching group is the only single "post-bachelor's degree" group large enough to serve as a continuing source for such recruitment. In addition, there is little indication that this source has been tapped other than randomly. If systematic recruitment were to occur among public school teachers, it is likely that their flow into formal and informal R, D, and D training efforts could be increased dramatically. (Appendix F-page 513).

3. Other academic disciplines and fields. Every observer of the educational research community has noted the paucity of representation from academicians, with the possible exception of the discipline of psychology. From the earliest days of initiation of the Cooperative Research Program in USOE, efforts and continuously pious hopes have been directed toward recruitment of the non-educationist to the study of education. In other fields this recruitment pool has been developed into a rich supply source; for example, "for every 1,000 new graduates with

engineering degrees who have entered the engineering profession in recent years about 165 had a degree in some other field."[27]

4. Younger age groups. The career line in research in education has followed roughly the standard career line in education. The average age of education doctorates has been 38+ years although this was reduced significantly among the trainees in the USOE Graduate Training Program to 31 years.[28] This trend toward tapping into a younger pool of recruits was affirmed by Worthen's analysis of the influence of the Cooperative Research Program (CRP) from 1957-1964 on career patterns of researchers in education. He noted that "before academic 1956-1957, an average of 14 years were spent in reaching the current position category. Since the CRP became operational, this period has been compressed to slightly over eight years." (See Appendix F, page 517). However, Worthen noted, as did Buswell,[29] that continued insistence on classroom teaching experience prior to graduate study in education is not only interfering with tapping

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[27] Scientists, Engineers, and Technicians in the 1960's: Requirements and Supply, National Science Foundation, NSF 63-34, Washington, D. C., 1963, p. 24.

[28] Sieber, op. cit., pp. 76-77.

[29] Buswell, Guy T.; McConnell, T. R.; Heiss, Ann M.; and Knoell, Dorothy M., Training for Educational Research, Cooperative Research Project no. 51074, Center for The Study of Higher Education, University of California, Berkeley, California, 1966, 150 pp.

this available pool but appears to be actually dysfunctional to subsequent career success (see Appendix F, p.514).

5. Business, industrial and military settings. An indeterminate number of social and behavioral scientists as well as of educationists have been attracted to work in settings which have a substantial stake in educational R, D, and D, although they are located outside the formal agencies designated to carry on education in the United States. The more recent revisions of the Cooperative Research Act have opened up government support to R, D, and D in these settings with the hope and expectation of adding their manpower resources to the educational R, D, and D pool.

6. Professors of education. One of the more obvious, though less often cited, pools of R, D, and D talent is comprised of professors in a school or department of education. The environment in these schools for research has been notoriously weak and has led to a situation where productivity of education doctorates in the first decade after receiving the degree amounts to .6 research reports per individual. A marked alteration in the environment and expectations of these institutions would allow the field to tap into the prolific output of doctorates for producing R, D, and D personnel.

Other smaller or more specific populations which might be tapped could be specified, but these six represent those generally cited as available pools of significant, potential manpower.

Tactics. What is going on at the present time in the name of training for research in education represents a number of tactics which the field is employing to increase the supply of educational R, D, and D personnel. These have been cited earlier, but they will be reviewed quickly at this point so that they can be placed in juxtaposition with the populations.

1. Federally-sponsored educational research training programs
    - a. Graduate Research Training Program
    - b. Post-doctoral Research Training Program
    - c. Undergraduate Research Training Program (now defunct)
    - d. Program Development Grants
    - e. Institutes and Special Training Projects
2. Regular educational research training programs at colleges and universities
3. Federal support through small contracts and grants
4. Employment of graduate and research assistants on grants and contracts
5. In-service development of personnel by operating R, D, and D programs and projects.

6. Extension of government support to projects and programs in new institutional settings.

Again, other specific efforts might be cited, but the primary tactics being employed are represented by these major headings.

Strategies. How, or if, these tactics add up to a strategy or strategies is the key point in viewing the future. A strategy would have to assume (1) some substantial assessment of the demand for personnel, (2) a realistic appraisal of current and projected supply sources, and (3) explicit identification of a series of programs (or tactics) which would bring the demand and supply figures into approximate concurrence. That three-dimensional grid would not be hard to build--just difficult to implement.

Currently, the tactics employed do not seem to represent a strategy; as a matter of fact, it would appear that no one is grappling with the question of an overall strategy. Consequently, individual programs or statements are difficult to assess. When the administrative leadership personnel of the Bureau of Research in USOE discuss educational research personnel development, they sound as if they have some (unspecified) strategy in mind; for example:

> The research training program is now well into its second year of supporting doctoral candidates in research training programs in education and in

> academic disciplines most appropriate for research in education. This program will need to expand still further to insure a continuing flow of researchers to work on the problems of education.[30]

That sounds reasonable, but the program to which Bright and Gideonse were referring had only a handful (42 to be exact) of the academic discipline recruits, with no prospects for attracting more. And, of course, the expansion was already in the process of contraction.

At the same time, these authors noted that development personnel, whom they labeled "behavioral engineers." "will need to be produced in considerable quantity through undergraduate and Master's degree programs."[31] Without debating the efficacy of the tactic, it is only necessary to point out that none of the undergraduate programs initiated under Title IV had this type of objective stated. Instead, all were directed toward recruiting bright undergraduates to careers in educational research.

The happenstances governing the tactics are well illustrated by Sieber's data on sex of trainees. No explicit effort was stated by USOE or the individual programs to tap the womanpower pool. However, 58 percent of the undergraduate trainees were women. Why? Because women are enrolled in education programs as undergraduates. The percentage returned to normal in the graduate programs, since the graduate population at the doctoral level was male.

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[30] Bright, Louis R., and Gideonse, Hendrik, D., Education Research and Its Relation to Policy, Mimeographed, prepared for presentation and discussion at the October, 1967 meeting of The Committee for Scientific and Technical Personnel, Office of Economic and Cultural Development, p. 38.

[31] Ibid.

So long as the discussion stays at the program or tactic level, however, there is always someone to allay one's fears. If Congresswoman Green suggests that the number of research laboratories be held down because of the shortage of qualified personnel, the response of a USOE spokesman is:

> "I don't go along. I don't agree that the shortage necessarily must be a handicap. I think we can attract good people from other disciplines. It's being done."[32]

If it is being done, and the staff analyses on this project certainly cannot substantiate such a claim, it is being done by individual program directors under the gun to fill vacant positions.

The evidence which the project staff has been able to gather would indicate that the positions will be filled by whoever is available. And, of course, the program will suffer the consequences. In the case of the Title III centers the consequence has clearly been to move them away from R, D, and D activities into supplemental service programs. In the case of R and D centers it would seem that the consequence would be to break down the concern for programmatic development and feature support for the interests of individuals who can be attracted to local support for their own projects.

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[32] Educational Researcher, op. cit., vol. 19, no. 2, 1968, p. 8.

Observations on Current Tactics

Without belaboring the point with endless references, it does seem reasonable to conclude that the tactics now being employed are programs, good for the field in and of themselves, which neither meet short-range nor long-range demands for personnel imposed by the present and projected stage of development of the field of R, D, and D in education. If the deficit in trained personnel were not so gross, it would be extremely useful to analyze each tactic and its projected output against the R, D, and D roles structure employed in this project, with special reference (1) to newer sources of supply which might be tapped to overcome deficits and (2) to other tactics which might be used to provide a comprehensive strategy. But the extant situation makes that an essentially academic endeavor. In more general terms, several observations seem pertinent:

The direct federal effort in the research training field is now restricted almost exclusively to fellowship support through the Graduate Training Programs. This touches chiefly one institutional setting (Colleges and Universities) and one functional emphasis (Research--

particularly, Investigating Educationally Oriented Problems). Even in this comparatively well-supported area, the demand deficit by FY '74 will be approximately 500 doctoral graduates. As a matter of fact, in 1974 the R and D centers alone will absorb 63 percent of the FY '74 graduates under federal sponsorship; that is, 102 of the 160 doctoral graduates.

Facets of the initial federal "strategy" have broken down completely. The Undergraduate Research Training Program has been abandoned as either a recruitment or a training device. The Program Development Grants have been so miniscule as to be ruled out as a change mechanism for educational research training programs in colleges and universities. The Institute and Special Projects Program has trained only a handful of personnel on a catch-as-catch-can basis in neophyte agency settings with no systematic plan. The Post-doctoral Research Training Program has been altered in focus and has involved so few individuals that it is effectively not a supply factor.

Regular educational research training programs at colleges and universities seem to have been left unaffected by the flurry of concern over manpower. The structure and content of the programs appear to have remained stable and no efforts of any magnitude are discernible in training for new roles.[33]

The small contract and grant program of USOE is serving to reinforce the Graduate Research Training Program under Title IV. Most of the recipients (72 percent) are working on research rather than on development type projects. There is overlap between the two populations, but the extent of overlap was not revealed by any data collected for this project. The training dimensions of the small contract program are still considered tangential to the central thrust of the program, but their small contracts do offer a training tool of sorts.

One could be more sanguine about the quantitative impact of training opportunities offered by graduate and research assistantships on projects and programs if it were not for the evidence of Buswell, _et al._, in regard to the 1954 and 1964 doctoral graduates in education. The reader will recall that, despite the increase in federal funding of R and D activities over this decade, the education doctoral candidate in 1964 was no more likely to have had an apprenticeship experience than his colleague of 10 years before.[34] This is partially accounted for by the growth in graduate school enrollments which offset some of the increased opportunities, but a more significant factor may be the nature of most assistantships. Except in rare cases, the demands of the project assignment are given first priority and those of training are given second priority. This causes the project director to seek out the best trained assistant he can find (new trainees are avoided where possible), and the nature of the experience is often less than challenging to the bright young researcher. These "trainees" are likely to be the already involved and producing young graduate researchers.

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[33] More evidence on these points will be presented later, based on a general survey of research training programs conducted for this project by Dr. Arliss Roaden.

[34] Buswell, _et al._, _op. cit._, pp. 44-45.

Another point to be made in regard to the assistantship as a personnel resource is the obvious prejudice in favor of the university-based researcher. Almost no assistantships were unearthed in this project's survey of Title III personnel. In contrast, the nine R and D centers had slightly over 300 assistantships. The 20 educational laboratories fell, as one might guess, between the two extremes but much closer to the Title III centers than to the R and D centers. Unless explicit attention is given to the assistantship as a training device, it is probably vastly over-rated as an alternate supply source for regular academic research training programs. The personnel involved will overlap very sharply with the Graduate Research Training Programs and the small contracts and grants, and will be directed toward one role--that of the university-based applied educational researcher.

The total effect on the manpower pool of R, D, and D projects and programs which attempt to train their own personnel is indeterminate. However, it is not an unmixed blessing, as evidenced by the Title III survey. At the very least, it is unsystematic and inefficient. At worst, it subverts the nature of the program to meet the exigencies imposed by the available manpower pool.

The extension of government funding opportunities to previously untouched agencies will increase the manpower pool. The efficacy of the technique depends upon whether the type of personnel required exists, in fact, in the new agencies. If it does not, and it is obvious from the recruitment pattern in many industrial and business agencies today that it does not, the technique simply transfers a portion of the existing manpower pool to a new agency.

Summary

There is no national strategy being employed currently to meet the demand for educational R, D, and D personnel. There are relatively untapped potential populations to be recruited to and trained in the field, but no systematic efforts to get at them. The range of tactics now being used are hard to assess because they are insulated from one another and most are designed explicitly to achieve non-training goals. Their contribution to training cannot be ignored, but it is usually overrated. The effect of the insular tactics is a marked imbalance in attention to projected demand. The force of most of the tactics is on the university-based researcher investigating educationally oriented problems. New roles and new settings are benefiting little from these tactics.

A comprehensive strategy would involve the interplay of roles, demand, and supply and the tactics of the strategy could be assessed within this framework. Present rationalizations about the "goodness" of individual programs tend to obfuscate essential weaknesses in this unplanned effort to meet educational R, D, and D requirements.

Curricula For and Impediments to Research Training in Schools of Education

In conjunction with, and under the sponsorship of, this project, Professor Arliss L. Roaden of the College of Education, The Ohio State University, undertook a general survey of educational research training programs operating in 1968. Through this sub-study, the project staff hoped to (1) up-date the knowledge about new and innovative programs of research training, (2) identify exciting exemplars of new programs if such existed, and (3) provide Professor Roaden, who was working on two other projects in the research and grants, and will be directed toward one role--that of the university-based applied educational researcher.

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Achievement of the first two objectives was thwarted by the paucity of innovative programs and practices unearthed by Professor Roaden's survey. The complete reports on his activities are included as Appendix G--An Analysis of Research Training Programs, and Appendix H--Some Impediments in Mounting Effective Educational Research Training Programs. This section of Chapter IV includes summaries of these two longer reports which emphasize the results of greatest significance to this project.

Survey of Curricula for Research Training

In August, 1967, a letter was sent to all directors of Title IV ESEA research training programs and to 340 professors concerned with research training in education who had been identified by Phi Delta Kappa's Office of Research Services. In addition to a request for general program descriptions, the following specific questions were posed: (1) What program content is considered unique? (2) What curriculum materials are used that are not normally available through commercial publishers? (3) What is the nature of apprenticeship experiences required of trainees? and (4) To what extent are persons being prepared to fill newly emerging R and D roles?

Program information adequate for analysis was received from 47 institutions describing predominately new federally-funded programs. Forty-four of these programs, in 40 institutions, were concerned with doctoral study or institutes, and the results reported here are restricted chiefly to these programs.

Doctoral Programs

The nature of sub-field specialization in educational research was very diverse considering the stage of development of the field. The 31 programs covered 58 substantive fields of specialization and 12 programs in research methodology. Over half (30) of these substantive fields of specialization were mentioned only once, e.g., adult education, agricultural education, child development, economics, etc. With limited resources (staff and student) available and devoted to research training in education, saturation rather than diffusion might be expected to be the norm.

Although experience in doing research was commonplace in doctoral research training programs, it was uncommon to attach any academic credit to such experiences. Considering the importance attached to apprenticeship training in research, it seemed inconsistent to withhold the primary token of academic exchange from this aspect of the program. In most instances, it appeared that the course was required and the experience was offered.

The usual locus of research experience (by better than 2:1) was the university department or a university agency (29). Seven programs mentioned public schools as the usual locus for the research experience, one mentioned a state education department, and four cited an educational laboratory or other research agency. These programs did not seem to be geared to meeting the demand for personnel to work in non-university settings.

Despite a strong emphasis in the questionnaire on identifying innovative program elements and training for new roles, there was little to report in regard to innovative programs and practices. To quote Professor Roaden directly, "these programs seemed little different from programs of the past."[35] The roles cited as vocational goals for program participants mentioned six newer roles among 61 noted.

Short-term Institutes

There seemed to be a preoccupation in the 13 institutes surveyed with instruction in conventional research techniques and training for proposal writing. There may have been an over-emphasis on textbook methodology, where case analyses, simulations, or practica would have been more relevant.

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[35] Appendix G, p. 550.

In this category, where conventional requirements of graduate study would not have forced compliance with existing programs, there were no marked innovations in program content, clientele, or program objectives to report.

Impediments in Mounting Effective Training Programs

The following summary is based upon Appendix H--a logical and empirical examination of impediments which must be overcome in order to mount effective research training programs in schools and colleges of education.

Academic and professional traditions in education. In the university tradition of professional schools, colleges of education have relied on supporting disciplines to bear primary responsibility for the production of research and researchers in education. However, the social and behavioral sciences, caught up in their own search for identity in the university community and operating with relatively crudely developed methodologies, have been unable to assume the burden thrust upon them.

The design and structure of undergraduate and graduate programs in education militate against the recruitment of students to research in education and graduate program emphasis on research training, i.e., the single-minded purpose of undergraduate programs to train teachers and the assumption of responsibility at the graduate level to train specialist practitioners.

The background of most professors in schools of education inclines them toward the role of defending the traditions which resist the establishment of educational research as a unique specialty.

Institutional and organizational arrangements for research training. The uncertainty of mission in colleges of education among calls for attention to teaching, research, and service has found research running third in a field of three.

With the essential reliance on the apprenticeship experience as *the* core of research training in education, genuine research assistantships have been sparse in schools of education.

The linear system of academic programs and career patterns in education has mandated against early and effective identification, motivation, and training of researchers in education.

The too frequent separation of researcher-professors and practitioner-professors in schools of education has interfered with opportunities for graduate experiences in research for students in schools of education.

Characteristics of research trainers. Colleges of education draw their staffs from among doctoral graduates in education; a group not distinguished by research production. This practice creates and perpetuates a cycle of non-research as current students, then, work with non-research faculty during their graduate study.

The established career patterns in education result in faculties in schools of education that are relatively advanced in age. This factor (increased age) has generally been found to be related negatively to research production. This would surely be the case in education where the intervening years have been spent, for the most part, in the pursuit of non-research activities.

Characteristics of Research Trainees. Current criteria for admission to graduate programs in education appear to be designed explicitly to recruit the potentially successful practitioner and may, probably do, implicitly mandate against attracting the potentially successful researcher.

Generalized admission criteria to graduate study do not distinguish among characteristics of individuals associated with success in various specializations. This failure to distinguish among potential in practice, on the one hand, and research, on the other, exacerbates the problem of recruitment for research caused by using the undergraduate teacher education pool and public school teaching pool as the primary foci for recruitment efforts.

Summary

Conclusions reached in regard to an empirical survey of Title IV--ESEA research training programs and surveys with similar content were that:

1. The curtailment of funds for ESEA Title IV research training programs reduced the quantitative impact of the programs on the supply of R, D, and D personnel in education to a point where it was not profitable to attempt to relate this miniscule production to substantial demands.

2. Awards were made chiefly to previously operating programs, and there seems to have been little impact on change in the field in terms of the type of training or trainee. Title IV--ESEA will, under its present operating pattern, reinforce the field of educational research as it has existed for the past decade.

3. New centers for research training have not emerged as a result of the awards granted to date. Nor has there been any major effect on the quantitative production of traditional training centers.

4. New roles for researchers in education have been literally ignored, whether the concern is expressed in terms of academic researchers (non-educationists) or development and diffusion personnel.

Analysis of an empirical survey of Title III centers designed to provide data on the response of the field to a critical shortage in R, D, and D personnel has indicated that:

1. The vacuum created by demands far beyond the field's ability to supply will be filled with whatever leadership talent is available, whether or not that talent has any special qualifications for the new assignment of responsibilities.

2. The projects and programs supported by new funding efforts will take on the characteristics of the personnel available to the agencies to staff the projects. If operating personnel are most readily available in schools, demonstrations will be preeminent activities. If developers and/or evaluators are hard to come by, few projects will be so designed.

A broad-ranging assessment of supply sources in education for educational R, D, and D personnel indicated that there is no national strategy being employed currently to meet the demand for educational R, D, and D personnel. There are relatively untapped potential populations to be recruited to and trained in the field, but there are no systematic efforts to get at them. The range of tactics now being used are hard to assess, because they are insulated from one another and most are designed explicitly to achieve non-training goals. Their contribution to training cannot be ignored but is usually overrated. The effect of the insular tactics is a marked imbalance in attention to projected demand. The force of most of the tactics is on the university-based researcher investigating educationally oriented problems. New roles and new settings are benefiting little from these tactics.

A comprehensive strategy would involve the interplay of roles, demand, and supply, and the tactics of the strategy could be assessed within this framework. Present rationalizations about the "goodness" of individual programs tend to obfuscate essential weaknesses in this unplanned effort to meet educational R, D, and D requirements.

The chapter concluded with a report on curricula for and impediments to research training in schools of education which was reported in summary form on pp. 364-370, and reported fully in appendixes G and H.

CHAPTER V

AN ASSESSMENT OF EMERGING ROLES IN EDUCATIONAL R, D AND D

The two quite distinct sections of this chapter reflect stages of progress in the staff's consideration of how the concept of new R, D, and D roles might be studied and analyzed. The initial strategy was, as it turned out, simplistic. Three data sources were identified:

1. Relevant literature. Much conjecture and some empirical evidence had been reported in the literature which pointed to the need for various educational R, D, and D personnel specialists who were unavailable currently.

2. Expert opinion. A number of individuals who had given serious though to, and had written about, the need for new roles in R, D, and D were invited to a conference session to discuss and amplify the new world of educational R, D, and D as they viewed it and the people who would inhabit that world. Additionally, expert opinion was sought by interview with other leaders in the field who were not in attendance at the conference.

3. Operating needs. On the assumption that leaders of new R, D, and D organizations would feel the need for personnel to fill new roles in their enterprises, interviews were conducted with such persons as directors of regional educational laboratories, R and D centers, etc.

The next step was viewed as a synthesis and analysis of these data to develop a systematic inventory of new roles which would assist appreciably in translating quantitative demands into requisite roles with specifiable behaviors. This turned out to be not even close to the actual case. The roles cited were sporadic, e.g., demands for new research roles were almost ignored in the literature in favor of the more dramatic need for D and D personnel. Citations of required roles were not comparable, i.e., some bridged multiple functions while others were highly specific. Different authors, although apparently concerned with the same unfulfilled function(s), used disparate labels which seemed to identify distinct roles. No one attempted to order a set of roles which encompassed a necessary span of ignored functions. The literature, the conference, and the interviews had an exhortatory rather than a substantive flavor. There was no question that a demand for new roles was being emphasized, but each individual seemed to concentrate chiefly on one example or set of examples to substantiate the necessity for the field to give serious consideration to new role development.

The question of whether there was some condition or set of conditions necessary for a role to "emerge" was ignored. Obviously, a statement in the literature that education requires a "county agent" presents no realistic expectation that such a role will emerge in education over the next decade.

These arguments are not to say that nothing was learned from examining the recitation of new roles in the literature, through expert opinion, and by interviews with operating R, D, and D administrators. However, these data were unsystematic and were nearly impossible to relate to the empirical data gathered in this study. A summary of what was found through these former sources will be followed by an alternate strategy for considering emergent roles which seemed to yield more powerful data on emergent roles.

Recitation of New Roles from Literature, Interview, and Conference Data

The material which follows is a summary of a much larger body of conjectural data about new positions needed to support current and future programs of educational R, D, and D. These citations were selected to represent points of view expressed frequently in the literature and though the interview and conference techniques used for data gathering.[1] No effort has been made to fit these data tightly into the definitions and structure of this study, although they are grouped under the major headings research, development, and diffusion.[2]

Research Roles

Miles,[3] pointed to a weakness in the field of educational R, D, and D from which a research role can at least be inferred. He noted that the collection of data about a particular problem is a familiar activity for most researchers. He also noted however, that "finding variables at the start which will maximize utilization of results, collaborating effectively with the practitioners involved, and designing a feedback mechanism which will be maximally useful to the client's system all seem to be skills that need further development."[4] This suggests a possible need for a "diagnostic research and feedback" role.

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[1] During December 13-15, 1966, a "Conference on Emerging Roles in Educational R, D, and D" was held at Indiana University, jointly sponsored by this project, the National Institute for the Study of Educational Change, and the Research Utilization Committee of the American Educational Research Association. Conference participants were selected to represent varied institutional settings (seven of the nine major institutional settings in the logical structure were represented) and functional emphases within the spectrum of R, D, and D activities.

[2] The list of persons interviewed in the study both for this purpose and for purposes cited earlier in Chapter III are listed in Appendix C.

[3] Miles, Matthew B., "Emerging Research Utilization Roles in Education," in Preparing Research Personnel for Education, pp. 7-13, edited by David L. Clark, and Blaine R. Worthen, Phi Delta Kappa, Bloomington, Indiana, 1967, 92 pp.

[4] *Ibid.*, pp. 11-12.

In 1966 Stanley wrote of the need for a "school research designer" who could (1) identify operational problems, (2) work with the staff of an educational research center to develop a research design covering the problems being encountered, and (3) implement the design.[5] The Milwaukee branch of the University of Wisconsin received a grant under ESEA Title IV to prepare a similar type of school researcher to "advise subject-matter specialists, teachers, and administrators on the design and analysis of studies and experiments, conduct research activities relevant to decision-making by the school staff, and accumulate, evaluate, and disseminate information about research and projects conducted at other locations."[6] At least one Title III center (in Ann Arbor, Michigan) was attempting to operationalize the school research designer role. The major objectives of professionals in the Title III center were to (1) discover the exact nature of a given teacher's problem, (2) translate the operational problem into a research design, and (3) conduct the research necessary to arrive at a solution.[7]

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[5] Stanley, Julian, "Preparing Educational Research Specialists for School Systems," Phi Delta Kappan 48:110-114, November, 1966.

[6] Remstad, Robert, Institute for Preparation of Central Office Research Specialists for Public and Private School Systems, a funded proposal to the U. S. Office of Education, Division of Higher Education, Research Training Branch, Washington, D.C., mimeographed, 1965.

Campbell and Sroufe[8] projected a function of state departments of education from which a "research broker" role could be inferred. Under the model they proposed, state departments of education would secure competent research assistance for schools by (1) identifying educational problems amenable to treatment through research, (2) determining the agency or agencies which could best attack the problem, and (3) contracting with the agency or agencies to conduct the study.

The National School Public Relations Association, calling for a para-researcher role, speculated that an "educational technologist" could translate research findings into new materials, suitable for classroom use, if he worked with researchers in the manner in which medical technologists work with physicians and engineers work with scientists.[9]

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[7] Chapman, Reubene, Training the Innovated Agent, a paper presented at the Annual Meeting of the American Educational Research Association, February 10, 1968, pp. 4-5.

[8] Campbell, R. F., and Sroufe, G. E., "The Emerging Role of State Departments of Education," in Strengthening State Departments of Education, edited by R. F. Campbell; G. E. Sroufe; and D. H. Layton, Midwest Administration Center, University of Chicago, Chicago, 1967, p. 86.

[9] National School Public Relations Association, Technology in Education, The Association, Washington, D.C. 1967, p. 9.

Development Roles

Unfulfilled development functions have been translated into projected individual and team roles to support course content improvement efforts, regional laboratory programs, and other invention and engineering projects in education. In an interview in October, 1966, Robert Glaser, Director of the Learning Research and Development Center at the University of Pittsburgh, reported his need for Master's degree level persons having a working knowledge of evaluation, programmed instruction, teaching practices, and psychology. In Glaser's words, such people "just do not exist"--and so the Pittsburgh R and D center is training them internally. In an article written about the same time, Glaser called this the "instructional designer" role.[10] Mager speculated about a similar role, which he labeled the "instructional technologist."[11] The skills and tasks Mager ascribed to this role included: (1) ability to derive and describe instructional goals in forms usable by the learner, (2) ability to identify environmental characteristics that facilitate or inhibit desired behavior changes, (3) ability to describe a wide variety of educational aids and devices and ability to evaluate these devices in terms of their contribution to given instructional goals, and (4) ability to construct criterion instruments by which the success of his efforts can be measured.

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[10] Glaser, Robert, "Psychological Bases for Instructional Design," AV Communication Review 14:4, Winter, 1966, pp. 433-449

[11] Mager, Robert F., "The Instructional Technologist," Educational Technology 7:9, May 15, 1967, pp. 1-2.

Miles speculated about the need for an "educational development specialist" whose role behaviors would be essentially those of an engineer.[12] In the same paper, he suggested that a "field tester" was needed to assess the workability, consequences, and feasibility of a particular innovation at the preliminary or pilot stage of development. He noted that a few such persons have been attached to Educational Testing Service, Educational Services Incorporated, the national curriculum groups, and some commercial publishers.[13]

Some educational laboratory programs suggested that another necessary role was that of "computer applications specialist." The Southeast Educational Development Laboratory, for example, was developing applications of computer technology to meet the management and instructional needs of schools and individual children.[14] The Southwest Regional Educational Laboratory was developing a computer-managed instructional system which would supply teachers with information about class and individual pupil progress toward the achievement of specified learning objectives and would prescribe instructional materials for deficiently-achieving pupils.[15]

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[12] Miles, _op_. _cit_., p. 9.

[13] _Ibid_. Earlier reference to the field tester role appears in a mimeographed paper of the Research Utilization Committee of the AERA, to which Miles was a contributor, dated 5/19/65, pp. 2-3.

Among the persons suggested the need for development teams composed of specialists was Loughary, who speculated that at least four non-teaching specialties will emerge in development teams: (1) "content research specialists," (2) "media specialists," (3) "systems specialists," and (4) "engineers."[16] Loughary envisioned these specialists serving as a support team to teachers; that is, given a statement of objectives and information about the pupils to be taught, the specialists would help the teacher develop appropriate instructional systems. The content researcher would take responsibility for identifying and synthesizing subject matter relevant to the particular objectives. Using an information retrieval system more sophisticated and sensitive than traditional manual classification systems, he would identify those materials which were maximally sensitive to the characteristics of the learners. In order to accomplish this, of course, he would have the capability of analyzing great amounts of materials in terms of both content and learning criteria.[17]

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[14] Programs in Progress--Regional Educational Laboratories, a notebook prepared by the Division of Educational Laboratories for participants in the October, 1967, Conference on Educational Laboratories, dated September 29, 1967.

[15] Ibid.

[16] Loughary, John W., "Preparation of Educators in the Age of Computers and New Media," in Man-Machine Systems in Education, Harper and Row, New York, 1966, p.216.

Given the learning goals, learners' characteristics, and a pool of material with which to work, the media specialists would determine the most effective modes of presentation and then construct instructional materials. Among the media specialists would be artists, audio-visual production specialists, and material programmers, all operating from a media laboratory or production shop.[18]

The systems specialists would take responsibility for putting the various resources together and designing a control procedure which would enable the teacher to exercise and maintain maximum surveillance and control over the teaching and learning processes.[19]

And, finally, in larger schools and colleges the efficient use, maintenance, and modification of complex man-machine education systems would require the services of engineers familiar with the school or college and with education in general.[20]

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[17] Ibid., p. 217.

[18] Ibid.

[19] Ibid., p. 218.

Among those specifying needed functions to be performed in a course content improvement center was Dr. Edward Towers who, when interviewed, specified that his staff was responsible for a sequence of activities as follows: (1) consideration of the rationale, that is, the philosophy undergirding instruction in the content area; (2) construction of a taxonomy to describe the body of the extant knowledge; (3) establishment of an appropriate development methodology; (4) development of curriculum materials; (5) development and operation of a training program for teachers; (6) continuous evaluation of program development (including teacher training), packaged materials, and required teacher behaviors and processes; and (7) revision of the product.[21]

Diffusion Roles

Positions noted in this category ranged from specific technical specialists required to support automated storage and retrieval systems, through a wide variety of "middle men" or "translators" who move research into practice, to general managers of the diffusion process.

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[20] *Ibid*., p. 217.

[21] Towers, Edward, Director, Industrial Arts Curriculum Project, The Ohio State University, Columbus, Ohio.

Among the roles specified as being needed immediately by planners and directors of ERIC clearning houses were (1) "index abstractors" to develop overall systems for (a) coordinating the indexing of documents for retrieval purposes, and (b) training other abstractors and assistants in the clearing houses[22] and (3) "unit user analysts" to (a) develop user studies which would relate and update inputs into the system and (b) solve retrieval problems which would accompany use of the system by a large and diverse population of persons.[23]

Every one of the 20 educational laboratories either has or is seeking persons to fill the role of "information storage and retrieval specialist," both to provide a support service to the in-house R, D, and D staff and to provide a service function to schools and school districts.[24] Along this line, Miles called for establishment of a "retriever-converter" role, so that the literature could be scanned and codified in such a manner that it could readily be translated into workable programs in schools and universities.[25]

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[22] The mimeographed proposals for ERIC clearing houses sent to the U. S. Office of Education by the University of Oregon and The Ohio State University (#6-2433 and #[illegible]-85-008, respectively) each contained a request for support of an index abstractor role.

[23] Mimeographed proposal of The Ohio State University for an ERIC clearing house, *ibid*.

[24] *Programs in Progress--Regional Educational Laboratories*, *op. cit*.

Some educational laboratories have been operating programs to translate research results into improved practice from which new roles may emerge. The Northwest Regional Educational Laboratory was using "carrier-linkers" to move ideas and research findings into teacher behaviors.[26] Another laboratory, Research for Better Schools (in Philadelphia), began in January, 1967, to prepare "research user teams" to assist school administrators to manage a program of planned change by systematically gathering and interpreting new research ideas and findings that have been or should be tested through field study.[27]

Jung[28] suggested a position which he labeled a "trainer change agent" role. This position would perform such functions as (1) identifying needs for, and providing training to, school staffs and central administrators,

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[25] Miles, op. cit., p. 9.

[26] Ward, William T., The Northwest Regional Educational Laboratory's Program to Prepare "Carrier Linkers," a paper presented at the Annual Meeting of the American Educational Research Association, February 16, 1967.

[27] "Research User Teams," Educational Technology 7:2, January 30, 1967, p. 24.

[28] Jung, Charles C., "The Trainer Change-Agent Role Within a School System," in Change in School Systems, edited by Goodwin Watson, National Training Laboratories, NEA, Washington, D. C., 1967, p. 103.

(2) providing demonstrations of skills, (3) training staff in skills, (4) making support for training generally available, (5) arranging staff access to other training resources, and (6) coordinating administration, research, and training as integrated parts of the system's problem solving procedures.

Lippitt called for establishment in local school systems of the "curriculum change agent" role.[29] In Lippitt's view, the person (or group) filling this role would inform teachers of curriculum resources outside the school system, corrdinate the adaptation of materials, train teachers in their use, and then service and nurture the innovative practice in the classroom.

Barton and Tiller speculated about the formation of regional educational service centers, the programs of which appear to infer the need for "local innovation stimulators."[30] The staff of the centers would develop and demonstrate innovations unique to a particular community or to a geographic area smaller than that which is served by an educational laboratory.

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[29] Lippitt, Ronald, "Processes of Curriculum Change," in Curriculum Change: Direction and Process, edited by Robert R. Leeper, Association for Supervision and Curriculum Development, NEA, Washington, D. C., 1966, p. 55.

[30] Barton, Rogers L., and Tiller, Martha Russell, "The Need to Relate Title III Projects to Other Federal Programs," Theory into Practice 6:143, June, 1967.

The emphases of the new instructional materials centers required "materials specialists." The function of the personnel in one of these centers was described as that of providing leadership in (1) utilization of materials, (2) correlation of materials for maximum value and utility, (3) interpretation of materials, (4) evaluation of materials, (5) development of new curriculum areas, and (6) development of new materials and techniques for classroom use.[31]

One participant at the "Conference on Emerging Roles" called for establishment of a "human factors analyst" role in education to assess the reactions of persons involved in innovation and to devise an installation strategy developed to fit the particular human factors involved. Another Conference participant noted the need for a "service and maintenance specialist." He commented that "the teachers, that is, the users of the product, are not capable of making screw driver adjustments on it. You will absolutely destroy your whole continuum if you go in there and have novices do the work that requires licensed technicians."

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[31] Saltzman, Stanley D., "Instructional Mateials Center--The Hub of Learning," Audio-Visual Instrucion 12:804, October, 1967.

Finally, to manage the overall diffusion process, both Miles[32] and Hopkins[33] have speculated about the need for a change manager who would administer a unit of the school system charged with stimulation, coordination, and control over the diffusion process in the school system.

Summary

Suggested research, development, and diffusion roles were gathered from (1) a review of relevent literature, (2) the transcript of a conference on emerging roles, and (3) interviews with leaders in educational R, D, and D. The roles cited were:

1. Research
   a. "Research diagnostician and feedback specialist"
   b. "Research design specialist for local school districts"
   c. "Research broker"
   d. "Educational technologist"
2. Development
   a. "Instructional designer"

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[32] Miles, Matthew B., "Some Properties of School Systems as Social Systems," in Change in School Systems, edited by Goodwin Watson, National Training Laboratories, NEA, Washington, D.C., 1967, pp. 25-26.

[33] Hopkins, John E., "Internal Training of Title III Specialists: An Imperative for Changing Educational Practice," Theory into Practice 6:137, June, 1967.

- b. "Instructional technologist"
- c. "Educational development specialist"
- d. "Computer applications specialist"
- e. "Content research specialist"
- f. "Media specialist"
- g. "Systems analysis specialist"
- h. "Educational engineer"

3. Diffusion
    - a. "Index abstractor"
    - b. "Unit user analyst"
    - c. "Information storage and retrieval specialist"
    - d. "Retriever-converter specialist"
    - e. "Carrier-linkers"
    - f. "Research user teams"
    - g. "Trainer-change agent"
    - h. "Curriculum change agent"
    - i. "Local innovation stimulator"
    - j. "Materials specialist"
    - k. "Human factors analyst"
    - l. "Service and maintenance specialist"
    - m. "Change manager."

A Logical Analysis of Emerging Roles

Even a cursory glance at the previous section substantiates the earlier claim that this potpourri of descriptive job titles is difficult to assess in operational terms. In a sense, to deal with emerging roles in these terms would be equivalent to basing projections of manpower demand solely on the speculation of individual program managers.

The alternative strategy adopted to bring some common level of conceptualization and terminology, a claim to comprehensiveness, and logical substantiation to the task employed the following rationale:

A role would have to be based in an institutional setting if it were, in fact, to emerge, because it is the institutional base which furnishes strength to a role. Further, unless a role were integrated with the broader support services provided by an institution, it would be insufficiently nurtured to survive.

Until an institution adopts new or modified R, D, and D program objectives, the R, D, and D roles in the institution are likely to remain static.

Consequently, evidence of a class of institutions adopting new or modified R, D, and D program objectives would be indicative of the emergence of "new" R, D, and D roles, and these would be the only roles likely to "emerge" and survive; that is, adoption of new institutional objectives would necessitate the performance of new functions within the institution by persons in roles which would emerge as a consequence, and, since roles gain their strength and nurturance from the institution in which they are based, it is only the institutionally-based roles which would actually emerge and survive.

In pursuing that reasoning, it appeared to the project staff that the U. S. Office of Education and National Science Foundation funding programs included in this study by virtue of the kinds of R, D, and D activities they supported had the ability to alter the objectives of established institutions when the local institutional and national funding program objectives differed. Where the objectives of _established_ institutions were altered toward the new R, D, and D funding program objectives, and where _new_ R, D, and D institutions appeared with new funding program objectives (e.g., the educational laboratories), it appeared that the likely outcome would be the emergence of new R, D, and D roles.

The "new" R, D, and D roles seemed likely to emerge in a setting in one of three forms: (1) as an existing role in sudden demand because of the adoption of new objectives, (2) as a major modification of an existing role, or (3) as a role new to the setting and perhaps new to education. The three were termed "increased demand," "modified"roles, and "new" roles, respectively. In the following section, these terms are used to describe both the functions and the roles which appeared likely to emerge in a setting as a result of the adoption of new objectives.

Procedures

The procedure followed was (1) to describe the apparent objectives of institutions in settings toward which new R, D, and D funding programs were directed, (2) to compare the apparent institutional objectives with the major objective(s) of funding programs relevant to the setting, (3) to list the functions likely to emerge in the setting as a result of adoption of funding program objectives, (4) to list the types of roles (not the descriptive titles of roles) likely to emerge as a result of the new functions to be performed, and (5) to summarize the emerging functions and roles by settings and draw conclusions about the roles likely to emerge within and across settings.

Description of institutional objectives. The data presented in Chapter II about the R, D, and D community in 1964 provided a basis for determining apparent institutional R, D, and D objectives before passage of the ESEA stimulated perturbations in those objectives. The project staff assumed that the pattern of R, D, and D staffing in institutions reflected accurately the R, D, and D objectives of the institutions. Consequently, the characterization (on page 75) of school system R, D, and D personnel as being "represented by some teachers, counselors, and administrators working for a small percentage of their time on R, D, and D projects; and by data gatherers functioning in a research division," was used to indicate that the R, D, and D objectives of school systems in 1964 were apparently limited (on an organized basis) to the gathering of data for administrative planning and quality control purposes.

Comparison of institutional and funding program objectives. Only the major objectives of new funding programs were compared with the apparent institutional objectives. For example, the development and diffusion objectives of ESEA Title III were considered simply to be the development and implementation of new forms of practice which would (1) improve instruction in the school system and (2) serve as a model for other school systems. Comparison of these development and diffusion objectives with the pre-ESEA institutional objectives described above led to the conclusion that the school systems would be undertaking some entirely new functions if they accepted the ESEA Title III objectives.

Enumeration of emergent functions. The new funding programs have not encountered difficulty in having institutions bid for, and accept, funds to support the performance of, R, D, and D activities designed to accomplish funding program objectives. The project staff made the assumption, then, that the institutions as a class are adopting the objectives of the new funding programs. In most instances that meant the institutions would have to perform additional functions if they were to accomplish the new objectives they had adopted. To carry the example further, adoption of the development and diffusion objectives of ESEA Title III by school systems required them to add some D and D functions to the research functions they were already performing (i.e., gathering planning data and engaging in quality control). To identify the new functions which would probably have to be performed, the project staff used the "Functional Emphases in the Process of R, D, and D" dimension of the logical structure. Thus, schools and school systems were said to be likely performers of the new functions of (1) inventing solutions to operating problems, (2) engineering packages and programs for educational use, (3) testing and evaluating solutions and programs, (4) informing target systems about solutions and programs, (5) demonstrating the effectiveness of solutions and programs, (6) training target systems in the use of solutions and programs, and (7) servicing and nurturing installed solutions and programs.

Enumeration of emerging roles. The project staff used as the framework for the final enumeration of emerging roles, the "Functional Emphases in Professional Assignment" dimension of the logical structure. In order to place the emerging roles enumerated in the text within the framework of the "professional assignment" dimension, the project staff determined the (1) task involved (e.g., training, stimulation, research) and (2) the kind of subunit used by the funding agency to accomplish its objectives (i.e., whether the agency used programs or projects) and assigned the emerging role(s) accordingly. To identify the emerging role as being new to the setting, a modification of an existing role, or an existing role in increased demand because of the new objectives adopted, the project staff related their knowledge of the general pattern of R, D, and D staffing in the setting, based on previous empirical surveys, to the services to be performed and made a judgment as to the avenue likely to be followed in creating the role within the setting.

To carry the example to completion, performance of the seven new development and diffusion functions was considered likely to lead to the establishment of development and diffusion roles in the school system setting. Since ESEA Title III uses "project" sub-units to accomplish its objectives, the new roles were identified as including "D, and D Project Directors and Staff" to fit the professional assignment dimension of the logical structure. It was known that development and diffusion activities were new to the setting so the roles would not emerge in the sense that they were existing roles in increased demand. Since the functions to be performed were quite different from the instructional, administrative, and research functions typically found in school systems, it did not appear likely that the emerging development and diffusion roles would be formed by modifying existing roles in school systems. Consequently, they were identified as "new" roles emerging in school systems. The new project roles enumerated included (1) "directors of D and D project centers," and (2) "staff of D and D project centers," including inventors, engineers, writers, evaluators, technical support personnel, disseminators, demonstrators, target system trainers, installers and servicers, and development and diffusion personnel trainers.

The frequency of incidence of roles emerging within settings and across settings, the relative strength of the demand for emerging roles, and the uniqueness of the contribution of the emerging roles were noted. From these factors, conclusions were drawn about the roles most likely to emerge within settings and across all of the settings for educational R, D, and D.

Analysis of Emerging Roles by Settings

Schools and colleges of education. The summary characterizations of the 1964 population of R, D, and D personnel in this setting, as reported in Chapter II (pages 116-117), were:

1. The preponderance of R, D, and D personnel in 1964 were located in college and university settings functioning as individual researchers on a part-time basis.

2. Most found that "part-time" meant a small proportion of their effort devoted to R, D, and D--from one-fifth to one-third.

3. Within the college and university setting some 50 percent to 60 percent of the personnel were affiliated organizationally with a school or college of education.

4. Few development and diffusion personnel seemed to be functioning in the R, D, and D community in 1964.

Changes were precipitated in these 1964 characterizations by five of the newer Office of Education programs relevant to this setting: (1) the R and D center program, (2) policy study center program, (3) research training program, (4) development programs and projects, and (5) the ERIC clearing house program.

If the pattern of staffing in 1964 was any indication, the research objective of schools of education at that time was to permit (and to support modestly) intermittent, part-time efforts by individual professors carrying out studies of an applied nature. Comparison of that objective with the research objective of the R and D center program led to the conclusion that adoption of the R and D center program would not necessitate the performance of additional functions in the setting, since the R and D centers are also carrying out studies of an applied nature. Nevertheless, research roles in schools of education will be altered and new research roles will emerge because the R and D centers' method differs so greatly from the research method traditionally employed in this setting. Each R and D center is mounting an intensive, coordinated research assault (over an extended time) on inter-related aspects of an educational problem area. As a result, it appeared likely that modification would be required in the roles of research administrators, hard core and regularly producing individual R, D, and D personnel, and technical support personnel.

Persons nominated as administrators of R and D centers and similar programs are likely to be either (1) administrators of a bureau which is probably supporting a variety of discrete research projects and a large service component, or (2) researchers with a heavy and continuing research commitment of their own (i.e., hard core producers devoting 66 percent or more of their time to research). The nominees would be asked to move from those tasks to administration, coordination, and stimulation of a larger and lengthier research attack on a programmed basis.

Regular producers would move toward full-time research, and both regular and hard core producers would move from individualistic research activity toward continuing membership on a programmatic research team.[34]

Technical support personnel (e.g., programmers, statisticians) would move from provision of general technical expertise on a consultative basis to contribution of new applications of their science for the production of solutions to operating problems on a full-time basis.[35]

The policy study center program brings to education the new function of gathering and preparing planning data for national policy-makers. Consequently, it appears that a new role in this setting will be that of planner for national policy-making.

The research training function was stimulated in schools and colleges of education by the research training program. Special programs for the training of researchers were not widespread in 1963-1964. Sieber found fewer than

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[34] In 1967, according to an analysis by Office of Education R and D center program personnel, the mature R and D centers employed (on the average) core faculty for more than 66 percent of their time.

[35] The Office of Education analysis referred to in the preceding footnote also indicated that technical support personnel in the mature R and D centers were employed more than 97 percent of their time, on the average.

20 doctoral-granting institutions in education which provided "a training program for people who want to make research a career, in any form other than the regular graduate degree program."[36] As a result of the establishment of the research training program, in 1966-1967 there were formal graduate training programs in 87 institutions and undergraduate training programs in 13 institutions--most of which were directed toward the training of researchers (see Table 84, Chapter IV). Each of the new training programs was required to have a director, commonly a research producer in his own right. Thus, a logical conclusion of adoption of the research training program appears to be that a virtually new role, director of research training, will be created.

According to the summary characterizations of the R, D, and D community in 1964, development activity was as peripheral to the educational research community as the community was itself peripheral to the field of education. Acceptance of the production objectives of the new development programs and projects, then, will require the adoption of such new functions in this setting as inventing solutions to operating problems, engineering packages and programs, and testing and evaluating solutions and programs.

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[36] Sieber, Sam D., The Organization of Educational Research in the United States, Cooperative Research Project No. 1974, Bureau of Applied Social Research, Columbia University, New York, 1966, p. 256.

To perform the tasks which grow out of adoption of these new functions, it appears likely that (1) there will be increased demand for individual development personnel (hard core, regular and occasional producers) and (2) that new roles will emerge for (a) directors of outside-funded development programs and projects; (b) staff of outside-funded development programs and projects, including inventors to apply research results to operating problems; engineers to produce and package the solution discovered; writers to translate concepts into communications; evaluators to test the proposed solutions; technical personnel (e.g., media specialists, design specialists) to provide support services, and development personnel trainers; and (c) staff of R, D, and D bureaus and institutes, to gather and assess data on the impact of new products and packages on operating programs.

The ERIC clearinghouse program brings to some schools of education the new diffusion function of informing target systems about solutions and programs. To perform the tasks which adoption of the new function requires, it appears likely that new roles will emerge for (1) administrators of outside-funded diffusion programs, and (2) staff of outside-funded diffusion programs, including information processors, information disseminators, technical support personnel (e.g., storage and retrieval specialists, editors), and diffusion personnel trainers.

In summary, the thrusts of five new Office of Education funding programs differ sufficiently from the established objectives of schools and colleges of education to precipitate a change in the functions found in the setting. The roles considered likely to emerge as a consequence of the adoption of the new functions include:

Increased Demand Roles

R, D, and D stimulators and coordinators

Hard core, regular, and occasionally-producing individual research personnel

Modified Roles

Research administrators

Hard core and regularly-producing individual research personnel

Technical support personnel (e.g., programmers, statisticians)

New Roles

Planner for national policy-making

Director of research training

Directors of outside-funded development programs and projects

Staff of outside-funded development programs and projects, including inventors, engineers, writers, evaluators, technical support personnel (e.g., media and design specialists), and development personnel trainers

Directors of outside-funded diffusion programs

Staff of outside-funded diffusion programs, including information processors, disseminators, technical support personnel (e.g., storage and retrieval specialists, editors), and diffusion personnel trainers

Other academic departments. The new "basic" research program of the Office of Education (administered in part by the National Research Council), the course content improvement activities to be supported through new USOE development programs and projects, and the course content improvement activities of the National Science Foundation are directed toward other academic departments in the college and university setting.

The basic scientific inquiry to be supported by the basic research program is not, of course, a new function in these departments. But sponsorship by education agencies of basic studies related to education and learning appears likely to increase the demand for performance of that function. In turn, it is likely that the increased demand will lead to the emergence of the role of director or staff member of an education-related research project.

Course content improvement projects seldom produce persons in other academic departments with lifelong career commitments to education. In the aggregate, though, the funds provided for support of course content improvement appear likely to produce increased demand for performance of the functions of (1) inventing solutions to operating problems, (2) engineering packages and programs for educational use, and (3) testing and evaluating solutions and programs. The activity of the two funding agencies may also produce increased demand for performance of the functions of (1) informing target systems about solutions and programs, (2) demonstrating the effectiveness of solutions and programs, (3) training target systems in the use of solutions and programs, and (4) servicing and nurturing installed solutions and programs.

Performance of these functions appears likely, in turn, to lead to increased demand for persons in other academic departments to fill the role (even temporarily) of director or staff member of education-related development and (possibly) diffusion projects.

College and university administration units. The focus of development projects supported by the Division of Higher Education Research in the Bureau of Research, USOE, is upon redevelopment of institutions for greater effectiveness and efficiency of operation. The press of increasing enrollments, higher costs, larger budgets, and student activism combine to reinforce the adoption of effectiveness and efficiency objectives by established institutions. Their achievement, however, would appear to require college and university administration units to perform the functions of (1) gathering operational and planning data for program redevelopment purposes, (2) inventing solutions to program problems, (3) engineering programs for use, and (4) testing and evaluating the programs used. To perform these functions, the modified and new roles which appear likely to emerge in college and university administration units include:

Modified Roles

Staff of institutional research bureaus who can (1) gather and assess operational program data and (2) prepare the long-range program plans needed for efficient operation

New Roles

Directors of institutional program development bureaus

Staff of institutional program development bureaus, including inventors, engineers, writers, technical support personnel, and evaluators

State departments of education. State department R, D, and D personnel in 1964 were characterized (on page 75) as being chiefly normative researchers in research divisions. Passage of the ESEA both strengthened the traditional objectives of these research divisions and added new objectives; that is, state department services are being strengthened by funds provided under Title V, and state department administration of Title III funds is adding new responsibilities for planning and directing school system development and diffusion activities. In addition, the Research Coordinating Unit (RCU) program of the Division of Comprehensive and Vocational Education Research provides funds to support R, D, and D personnel in this setting.

Among the general services of state departments being strengthened with funds from the ESEA Title V program are study, planning, evaluation, and research. As was indicated on page 192-3, the demand for these services was increased as a result of receipt of Title V funds. Consequently, as the amount of funds provided under Title V increases it appears likely there will be a commensurate increase in the demand in state departments for staff members of R, D, and D divisions, including data gatherers, researchers, planners, and evaluators.

Administration of funds provided by the ESEA Title III program will require state departments to assume as new functions (1) the gathering and preparation of data for state-wide development and diffusion plans, (2) the informing of target systems about new solutions and programs, and, perhaps, (3) the demonstration of the effectiveness of solutions and programs. The effect upon state department R, D, and D roles of assumption of these new functions appears to be the emergence of the new roles of:

Directors of development and diffusion planning programs

Development and diffusion planning staff, including planners, evaluators, disseminators, and (perhaps) demonstrators

Development and diffusion technical personnel, to provide consultative service to local school districts

Stimulators and coordinators of development and diffusion projects.

The number of units in the Research Coordinating Unit program is to be increased from 44 to 48, and (with state matching funds) the financial support for each is to be increased by one third (to an average annual level of $100,000). These actions were taken because of increased demand for the function being performed by RCU personnel; to wit, informing target systems about research results, solutions, and programs. It appears likely, then, that the RCU program will increase the demand for diffusion program staff in state department R, D, and D divisions.

Schools and school systems. In 1964, R, D, and D personnel in this setting were characterized (on page 75) as being "represented by some teachers, counselors, and administrators working for a small percentage of their time on R, D, and D projects; and by data gatherers functioning in a research division." With the passage of the ESEA, new development and diffusion objectives were offered to school districts under Title III of that Act:

> The Commissioner shall carry out a program for making grants for supplementary educational centers and services . . . to stimulate and assist in the development and establishment of exemplary elementary and secondary school educational programs to serve as models for regular school programs.[37]

In addition, formation of the educational laboratories provided opportunities to add new development and diffusion objectives, because the laboratories are attempting to develop forms of improved practice which can be inserted into many school districts in their region and elsewhere.

School systems with development and diffusion centers supported by funds provided by the ESEA Title III program are undertaking functions which, according to the 1964 description, are new to the setting: (1) inventing solutions to operating problems, (2) engineering packages and programs for educational use, (3) testing and evaluating solutions and programs, (4) informing target systems about solutions and programs, (5) demonstrating the effectiveness of solutions and programs, (6) training target systems in the use of solutions and programs, and (7) servicing and nurturing installed solutions and programs. Implementation of these newly-adopted functions appears likely to require modification of some roles in the setting and addition of others, as follows:

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[37] Elementary and Secondary Education Amendments of 1967, House of Representatives Conference Report no. 1049, 90th Congress, 1st Session, p. 7.

Modified Roles

Staff in institutional research divisions will need to re-direct their services toward operating program evaluation.

Occasionally-producing individual D and D personnel will likely become members of a system-supported project team.

New Roles

Directors of D and D project centers

Staff of D and D centers, including inventors, engineers, writers, evaluators, technical support personnel, disseminators, demonstrators, target system trainers, installers and servicers, and development and diffusion personnel trainers.

The efforts of the laboratories in the educational laboratory program to develop new forms of practice, either themselves or in concert with school districts, will reinforce the need of school systems to perform the functions and adopt the roles enumerated for the Title III program above.

Private institutes and agencies. In 1964, most private institutes and agencies were engaged in research. Acceptance of support provided by two new funding programs indicates that the institutes and agencies in this setting are adopting development and diffusion objectives as well, e.g., the policy study center program and development and diffusion programs and projects.

One of the centers in the new policy study center program has been located in this setting. It brings to the setting the new function of gathering and preparing planning data for national policy-makers and, consequently, the new role of planner for national policy-making.

Office of Education administrators have noted that recipients of future development and diffusion programs and projects are more likely to be combinations of schools of education, school systems, educational laboratories, and/or private and commercial organizations, than a representative of a single type of agency. Involvement of private institutes and agencies in these development and diffusion combines will bring to the setting the new functions of (1) invention, (2) engineering, (3) testing and evaluating, (4) informing, (5) demonstrating, (6) training target systems, and (7) servicing and nurturing installed solutions and programs. Pursuit of the new functions will require establishment of new roles as directors of outside-funded D and D programs and projects; staff to man the outside-funded D and D programs and projects, including inventors, engineers, writers, evaluators, technical support personnel, disseminators, demonstrators, target system trainers, installers, servicers, and development and diffusion personnel trainers, and stimulators and coordinators of D and D programs and projects.

Professional associations. Professional association representatives in the 1964 population were characterized (on page 68) as "employees of research divisions. . . engaged chiefly in normative research." The ERIC clearinghouse program has since involved several associations in actual dissemination of information in their area of specialization, e.g., the International Reading Association, Council for Exceptional Children, Modern Language Association of America. In other words, the professional associations have taken on the additional diffusion function of informing target systems about solutions and programs. To perform that new function, the affected associations will need to establish the new roles of directors of outside-supported diffusion programs, and staff of outside-funded diffusion programs, including disseminators, technical support personnel, and diffusion personnel trainers.

Educational laboratories. The laboratories are new institutions performing development and diffusion activities in education. Almost by definition, the functions performed in the laboratories are new. They include the functions of (1) inventing, (2) engineering, (3) testing and evaluating, (4) disseminating, (5) demonstrating, (6) target system training, and (7) servicing and nurturing installed solutions and programs. Pursuit of the new functions will require the establishment of new roles as directors of outside-funded D and D programs and projects; staff of outside-funded D and D programs and projects, including inventors, engineers, writers, evaluators, technical support personnel, disseminators, demonstrators, target system trainers, installers, servicers, and development and diffusion personnel trainers; and stimulators and coordinators of D and D programs and projects.

Business and industrial organizations. Few personnel were identified in this setting in 1964, but the data available were incomplete. Product development and diffusion was being performed by publishing houses and the forerunners of the now-massive "education industry." The impetus for increased R, D, and D activity in this sector has been the funds (and purchasing power) provided school systems under several ESEA titles (I, II, III, and others in subsequent amendments).

Development and diffusion may be new activities for some in this setting, but for the most part at least one of the partners in the industry-publishing house mergers which have taken place has had experience in educational D and D. Consequently, it appears there will be increased demand for performance of the functions of (1) inventing, (2) engineering, (3) testing and evaluating, (4) disseminating, (5) demonstrating, (6) target system training, and (7) servicing and nurturing installed solutions and programs. The roles likely to emerge in this setting may best be described as emerging because of increased demand. They appear likely to be directors of outside-funded and internally-supported D and D programs and projects, and staff of outside-funded and internally-supported D and D programs and projects, including inventors, engineers, writers, evaluators, technical support personnel, disseminators, demonstrators, target system trainers, installers, servicers, and development and diffusion personnel trainers.

Summary. The acceptance by established and new institutions of funds provided by new R, D, and D programs implies adoption of the objectives of the new programs, as well. Where the objectives adopted are new, their accomplishment requires the institution to undertake new functions. Performance of the new functions mandates either the establishment of new roles, modification of existing professional roles, or, in those instances where the functions to be undertaken are extensions of current activities, increased demand for performance of existing roles.

There will be increasing demand for basic and education-oriented research functions in three settings, but the major change will be the adoption of, or increased demand for, development and diffusion functions. That being the case, the role most likely to emerge will be development and diffusion roles which are programmatic in nature and are sustained by outside, rather than internal institutional, funds.

Conclusions

The following conclusions were drawn from the preceding logical analysis of roles likely to emerge in and across the several institutional settings.

1. The response of schools and colleges of education will be central to the success of the new thrusts in educational R, D, and D. As the wide range of role adaptations and adoptions in the setting indicate, schools of education are involved in every aspect of R, D, and D, and their ability to change will determine the effectiveness of many funding programs.

2. Other academic departments will supply additional short-term manpower for course content improvement activities and longer-term manpower for basic research relating to human learning. Joint appointments will likely be used increasingly to formalize the relationship between educationists and academicians. Those actions will not likely result in the emergence of a new educational R, D, and D role in other academic departments, however, because (a) the curriculum content developers confine their involvement to specific projects over a definite period of time, and (b) the basic researchers will be pursuing avenues

of research appropriate to the career research plan they have been following in their own departments.

3. Both college and university administration units and state department of education R, D, and D divisions will create a few new roles to accommodate new responsibilities in development, especially. However, the new roles will be no stronger, nor have any more impact upon their target populations, than the units and divisions in which they are based.

4. During the next several years, development and diffusion roles will emerge in schools and school systems. Over time, experience will indicate the scope of the development and diffusion tasks appropriate for the persons occupying the school system D and D roles. Institutionalization of the D and D roles may be more difficult in this setting because the conditions for D and D (e.g., time to think and tinker, funds to develop and test several alternatives) run counter to convential behaviors in this cost- and supervisory-conscious setting.

5. Private development institutes and agencies (and, to a lesser degree, business and industrial organizations) will lead the way in creating specialist roles within the development and diffusion functional areas, since they will be special- or single-purpose institutions as contrasted with universities, schools, state departments, and others having multiple purposes.

6. Professional association adoption of dissemination roles within their organization is a logical extension of their interests which should lead to easy institutionalization of the new roles. There appear to be few reasons or other bases for anticipating any broader participation by professional associations in the overall R, D, and D process.

7. Educational laboratories will support some new roles in development and diffusion, but their impact remains ambiguous because the nature and scope of laboratory involvement in the educational development and diffusion process is still unclear.

8. Business and industrial organizations will be major employers of persons trained for new development and diffusion roles.

9. The roles certain to be in greatest demand are development director and staff roles in outside-funded development programs. Initially, these roles will "bridge" specific development functions (e.g., invention and engineering) because of the lack of experience with the process and the dearth of qualified persons in the field.

10. Other roles certain to emerge are (a) technical support personnel, (b) development project personnel, (c) training personnel, and (d) stimulators and coordinators of R, D, and D activities.

11. Widespread and effective implementation of these emerging roles will be restricted over an extended time by an absence of training programs for the emerging roles. Training programs will not easily be developed because of the lack of (a) knowledge of appropriate content and (b) methodologies to support persons being trained for the new roles.

12. Technical support personnel are certain to be in great demand but short supply. Since they are specialists who must have developed a field of expertise, their shortage will not quickly or easily be remedied. A move toward establishment of these support personnel as a technical-professional class, and the recruitment and training of a large number of persons to fill these roles, appear to be among the actions most urgently-needed by the field.

13. Emergence of diffusion roles will be delayed because responsibility for (a) training target systems in the use of solutions and programs and (b) the servicing and nurturing of installed solutions and programs has not been clearly accepted by any institution at this time. This may require the creation of a new R, D, and D institution or (more likely) the addition of a major new segment to the R, D, and D mechanisms now available to school systems and to college and universities.

Summary

Suggested research, development, and diffusion roles were gathered from (1) a review of relevant literature, (2) the transcript of a conference on emerging roles, and (3) interviews with leaders in educational R, D, and D. The roles suggested were presented as being (1) research, (2) development, or (3) diffusion roles. The result was a pot pourri of descriptive job titles lacking (1) a common level of conceptualization, (2) a claim to comprehensiveness, and (3) logical substantiation.

On the basis of the rationale that an emerging role would have to be (1) based in an institutional setting if it were to survive, and (2) impelled by a change in the program objectives of the institution in which it was based, a logical analysis was undertaken of the roles which could be expected to emerge as institutions adopted the objectives of new R, D, and D funding programs.

The procedure followed was (1) to describe the apparent objectives of institutions in settings toward which new R, D, and D funding programs were directed, (2) to compare the apparent institutional objectives with the major objective(s) of funding programs relevant to the setting, (3) to list the functions likely to emerge in the setting as a result of adoption of funding program objectives, (4) to list the roles likely to emerge as a result of the new functions and roles and draw conclusions about the roles likely to emerge within and across settings.

Among the conclusions were the following:

1. The roles most likely to emerge are (a) director and staff of outside-funded development programs, (b) technical support personnel, (c) development project personnel, (d) training personnel, and (e) stimulators and coordinators of R, D, and D activities.

2. Among the actions most urgently needed by the field are (a) development of the content and methodological bases for the emerging roles in a form suitable for use in training programs, and (b) immediate recruitment and training of a technical-professional class of R, D, and D support personnel.

3. Emergence of diffusion roles will be delayed because performance of diffusion functions has not yet been adopted as an objective by any institution.

4. The response of schools and colleges of education will be central to the success of the new thrusts in educational R, D, and D.

5. The scope of development and diffusion responsibilities within several settings is unclear and, consequently, the D and D roles to emerge in these settings will be determined by experience over time.

6. Private development and diffusion institutes and agencies will lead the way in creating specialist roles within the development and diffusion functional areas.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

There are two major findings in this study of educational manpower demand and supply, one quantitative and the other qualitative:

1. Demand for trained R, D, and D personnel in 1974 is likely to approximate five times the 1964 demand. Yet the yearly training output is still roughly the same as it was in 1964.

2. Extensive fluctuation is occurring in the nature of the manpower demand in relation to research, development, and diffusion competencies. Yet the response of the field has been to replicate in its training programs the proportions of personnel found in the 1964 R, D, and D community.

The field's dysfunctional response to quantitative demand is illustrated by the following:

In 1974, there are likely to be 19,436 R, D, and D positions, as compared to 4,125 in 1964. The least amount of growth projected was three times the 1964 population; the optimum growth projected was roughly seven times the 1964 population. The increase in quantitative production of traditional training centers, on the other hand, was adjudged to be so miniscule in relation to the demand projected that the staff did not consider it profitable to attempt to relate the two.

The dysfunctional orientation of training programs to changes in the nature of the demand is illustrated by the following:

Research positions were projected to decline from 95.6 percent of the total number of R, D, and D positions in 1964 to 33 percent of the 1974 R, D, and D positions. Development positions were projected to constitute 50 percent of the total in 1974, versus 3.2 percent in 1964. Diffusion positions in 1974 were projected to be 17 percent of the total versus 1.2 percent in 1964. Current training programs have literally ignored "new" roles, whether the new roles are considered to be academic (i.e., non-educationist) researchers or development and diffusion personnel.

The burgeoning demand and dysfunctional responses, both quantitatively and qualitatively, led to the following conclusions about the consequences of the field's response to date:

1. The vacuum created by demand far exceeding available supply will be filled with whatever leadership and staff talent is available, whether or not that talent has any special qualifications for the new responsibilities.

2. The projects and programs supported by new funding programs will take on the characteristics of the personnel available to act as staff. Consequently, neither the agencies which provide the funds nor the institutions which adopt the new objectives of the funding agencies will, in fact, be able to secure the objectives established.

3. Serious slippage will occur in the measurable progress of R, D, and D organizations because of the time devoted to finding virtually non-existent personnel.

A lack of future planning has permitted the conditions to develop which are resulting in these damaging consequences for the new program thrusts in educational R, D, and D. A continued lack of planning will result in an exacerbation of these negative consequences. The project staff recommends the establishment of a body which would develop systematic plans for recruiting and training required manpower and, perhaps over time, would enable R, D, and D programs and projects to be so staffed that they would have the capability of proceeding toward the objectives now held by ESEA R, D, and D programs.

Recommendations

While examining the operation of the current Title IV research training programs in Chapter IV, the authors suggested that USOE had accepted a non-strategy in formulating its research training program, i.e., a series of tactics which, taken together, were unresponsive to the demands for R, D, and D personnel in the field. The summary recommendation of the study is, simply, to convert this non-strategy into a strategy which will be responsive to the primary manpower demands of the field.

Although a series of actions directed toward meeting these demands will be offered for illustrative purposes, the primary recommendation is to:

Establish a National Manpower Commission for Educational R, D, and D personnel with a working executive staff to (1) assess continuously the extent and nature of the demand for personnel in the field, (2) establish a strategy and appropriate tactics for meeting this demand, and (3) evaluate the success of the strategy and tactics over time. Since USOE possesses the authorization to engage in support of R, D, and D training in education, the Commission should function under their auspices and should represent (1) the basic disciplines from which education draws its knowledge base, (2) the conventional community of educationists engaged in research, and (3) the newer agents and agencies planning and operating programs of development and diffusion activities in education.

In the opinion of the authors of this study, such a commission, functioning in 1968, would concern itself with a strategy directed toward the following objectives:

1. Increasing the number of researchers from basic discipline areas such as sociology, economics, political science, etc. who are interested in, and competent to study, educational problems.

2. Increasing the productive output, and improving qualitatively, the training of conventional research personnel in education, i.e., those engaged in investigating educationally oriented problems who are functioning chiefly as educationists.

3. Establishing a training network to produce development and diffusion personnel in large numbers in a relatively short period of time.

Without attempting to chart a national strategy, it appears that the following tactics would be appropriate to the objectives stated above:

1. Concentrate a base of fellowship and program support in 20 to 30 productive research centers. The open competitive proposal technique has served the profession well in stimulating and supporting research projects, particularly in institutions of higher education. This does not mean, however, that it is the only technique which can be used in achieving a nationally agreed upon educational objective, and it has not seemed to work well in increasing the quantitative supply of R, D, and D personnel in the field of education.

Only a small number of institutions in the country have consistently graduated active and productive educational researchers. Their level of quantitative production of R, D, and D personnel has been small because the heavy reliance upon apprenticeship experience in research training programs has made research an expensive proposition. These highly productive training institutions have lacked financial resources with which to expand their programs; the one lack which a funding agency is able to remedy.

In this case it would appear that significant increases in the immediate quantitative output of research personnel in education would be more likely of achievement if the funding agency were to work closely with a limited number of productive institutions, on an invitational basis, to take advantage of strength which already exists in the field. It must be clear by now that the mere provision of support monies for research training will not result in the production of a greater number of graduates. Almost none of the current Title IV research training proposals indicated there would be a significant increase in their quantitative production of researchers as a consequence of the support requested. As a matter of fact, as DeLorenzo pointed out, most of the enrollees in the Title IV graduate training programs appeared to be students who would have been enrolled in these programs had there been no fellowship support.

If substantial program development funds were added to concentrated training funds placed in the 20 to 30 high producing research institutions in this country, there is little doubt that these institutions could markedly increase their quantitative production of research personnel. Fortunately these centers of research productivity in education are also, for the most part, university centers of excellence in the social and behavioral sciences. University proposals from these sites could include extensive involvement of the discipline areas, with a consequent increase in the number of persons from these areas who would become involved in educational research.

2. Extend the number of productive research centers through substantial program development grants. There are 15 to 25 institutions of higher education in this country that are building up to a point where they can become solid producers of research personnel in education. Judicious use of long-term (five to ten year) program development grants would allow these institutions to expand staff and facilities and to short circuit the longer evolutionary process they will have to follow if they rely entirely on local funds.

3. Initiate course content improvement programs in educational R, D, and D. Course content development in educational R, D, and D could have three dimensions. First, much of the technical content (e.g., statistics) common to

all programs could be reduced to self-instructional kits which would save staff time and insure quality instruction in programs in smaller institutions. Second, bodies of content available in the social and behavioral sciences generally, but not available in the educational research field, could be packaged for use, e.g., normative research techniques as taught in sociology, or a relatively new approach such as facet design. Third, areas of knowledge which are poorly developed could be pushed forward, e.g., operations research or quality control techniques, aexperimental design, the "new" content of evaluation.

A serious and large scale course content improvement effort should bring forth high return for limited input. In addition to the obvious impact on the quality of instruction, it should broaden the conception of research training, from the use of interdisciplinary techniques through the training of development personnel, and should optimize the use of a limited number of trainers.

4. *Establish and support experimental or developmental programs in the training of research, development, and diffusion personnel.* The problem confronting the field in conventional research training programs is, as long as the course content improvement work described above is proceeding, essentially one of improving the process in order to produce a greater number of trained researchers. Experimental and developmental programs should be supported

which (a) rely more heavily on cognitive inputs and less heavily on the apprenticeship experiences which are now used as a substitute, and (b) attempt to reduce the time required to prepare competent researchers.

The problem confronting the field in producing trained development and diffusion personnel is very different from that required in increasing the output of researchers. Current training programs do not exist, the necessary and sufficient content of the programs is uncertain, and the demand, in quantitative terms, is greater. To slough off this challenge to less prestigeful institutions of higher education, as has been the case under the current Title IV program, is to abandon the prize almost completely.

Operating development and diffusion organizations in a variety of institutional settings are interested in, and capable of, working together to establish experimental programs which will examine the question of valid content while the training of some developers and diffusers is proceeding. These institutions, working in conjunction with institutions of higher education, could mount developmental programs to train designers, engineers, product testers, evaluators, information science specialists, etc.

No strong expectations of actual quantitative output should be allowed to burden those experimental research, development, and diffusion training programs. They should be set up as forerunners of future programs which might be established, with varying time periods of study, in diverse institutional settings. The object of the game should be to discover effective and efficient means to train personnel for new R, D, and D roles in education.

5. Establish consortia of institutions for the in-service development of D and D personnel in education. The field of educational D and D will not stand still to allow conventional training agencies to gear up to a challenge they are currently incapable of handling. Local public schools need quality control researchers now! Course content improvement centers need educational materials developers now! Title III centers need evaluators now! A personnel shortage of this magnitude in an area where training requirements are obscure will not permit a perfect solution. However, there is no question that a few short-term institutes, designed, at best, to re-tread practitioners in the use of conventional research techniques, is an absurd response.

Perhaps the educational laboratories could be used as a vehicle for coordinating training talents in their regions. They might attempt to mount some comprehensive regional efforts to provide on-the-job experiences, plus seminars and self-instruction, for trainees in various categories. With or without the cooperation of the laboratories, a dozen or more consortia of regional resources could be set up to establish D and D training sites at central locations. These training sites could pull together the best that is currently known about training for D and D roles. If training funds _per se_ are too limited to support such moves, USOE should solicit broadened authorization under ESEA to designate a portion of their operational grants for training purposes. Congress must be alerted to the subversion of operating programs which results from use of untrained personnel. No single institution can do the job, and the length of conventional training programs effectively eliminates them as producers of the personnel required.

6. _Legitimate and systematize the use of_ (a) _small contract or grant programs and_ (b) _operating R, D, and D sites as training devices for educational R, D, and D personnel_. There are obvious possibilities in several extant programs for helping personnel learn while they earn. But these possibilities will be exploited weakly when the funding agency apologizes for their use (as is the case in the small contract program) or assumes they will be used in the natural course of events. To the contrary, operating agencies which have no funds specified for training may have research or graduate assistants who are receiving some training, but, for the most part, these assistants will be used to handle routine tasks necessary to the work of the organization and any training will be incidental. Educational laboratories, Title III centers, and R and D

centers do not have surpluses in their budgets to optimize training opportunities for staff assistants.

Without debating the question of authorization to use funds for training, it should be pointed out that these operating field sites offer a priceless opportunity for increasing dramatically the pool of R, D, and D manpower if (a) some of their funds can be set aside for this purpose, and (b) their program plans, singly and collectively, can be designed to foster personnel training. The educational laboratories, for example, should probably establish a national coordinating agency to develop D and D manpower in laboratory programs in conjunction with institutions of higher education, state education agencies, and local education agencies in their regions.

7. _Organize national recruitment efforts directed toward the utilization of available recruitment pools for educational R, D, and D personnel_. The only sub-program under the Title IV training programs which was designed for recruitment (the undergraduate training program) has been abandoned. Despite continuing laments in regard to personnel shortages and citations of available manpower pools, there is no concerted effort on the part of USOE or the professional educational research associations to tap these pools. Without suggesting specific devices, which could be invented with no great difficulty, it should

be noted that current tactics are literally ignoring the available pools specified in Chapter IV.

These seven illustrations are offered as just that--illustrations. The essential recommendation remains:

1. The establishment of a National Manpower Commission for Educational R, D, and D Personnel

2. The specification of objectives to be sought in the educational R, D, and D personnel field

3. The development of a strategy for attaining the objectives

4. The explication of tactics, within available fiscal resources, to implement the strategy.

If this report and these recommendations seem overly critical of the present Title IV training programs, they are not meant to be so. The small staff assigned to administer this program had to operate under sharp constraints from the word "go." They were expected to dispense a large sum of money in a short period of time (during FY '66) and then had their fiscal base shattered. They were understaffed consistently, as are most USOE funding programs, and squeezed out financially when other fiscal demands within USOE became stronger. This report wishes to look forward--not back. The current situation with regard to educational R, D, and D manpower needs immediate and dramatic attention--and the Title IV training programs as presently organized and operated are irrelevant to the problem. That is the reason for the call to establish the Manpower Commission and to get on with the task without a backward glance.

APPENDIX A

FORMS USED IN THE NATIONAL REGISTER PROJECT

A large body of normative data was used in this study which had been gathered for the *Development of a National Register of Educational Researchers* project.[1] On the following pages are a copy of the questionnaire and supporting pages used by the researchers on that project.

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[1] Bargar, Robert; Guba, Egon; and Okorodudu, Corahann, *Development of a National Register of Educational Researchers*, The Ohio State University Research Foundation, Columbus, Ohio; 1965, 139 pages.

NAME: FIRST MIDDLE LAST

TITLE

BRANCH, DEPARTMENT, OR DIVISION

INSTITUTION OR AGENCY

STREET – PLEASE CHECK: HOME ___ OFFICE ___

CITY STATE ZIP CODE

NOTE: If either the name or address printed on the mailing label is incorrect, please provide the correct information in the space above.

NATIONAL REGISTER OF EDUCATIONAL RESEARCHERS QUESTIONNAIRE
NATIONAL REGISTER PROJECT

191 Arps Hall
1945 North High Street
Columbus, Ohio 43210
Phone 293-4872

Please print or type all answers

VITA:

1. Birthdate (month, day, year) __________

2. Birthplace (state or country) __________

3. Sex (please check)
   1. Female ___
   2. Male ___

EDUCATION:

4. Please provide the following information concerning all of your earned degrees. List your degrees in chronological order.

DEGREE	MAJOR	MINOR	INSTITUTION	LOCATION	YEAR OF DEGREE

5. If you are presently working toward a degree, please indicate the following:

DEGREE	MAJOR	MINOR	INSTITUTION	LOCATION	EXPECTED YEAR OF DEGREE

PROFESSIONAL IDENTIFICATION:

6. From the accompanying **Sub-Fields List**, select and enter in the lines below in decreasing order the sub-field or sub-fields in which you consider that you have your greatest competence as based upon your education and professional experience. Please list the code number as well as the sub-field title.

CODE # SUB-FIELD TITLE CODE # SUB-FIELD TITLE

1. _____ __________ 3. _____ __________

2. _____ __________ 4. _____ __________

PROFESSIONAL EMPLOYMENT:

7. Have you been professionally employed during the past year? Please check. 1. Yes ___ 2. No ___

If no, you may move on to item 12. If yes, please answer the following items.

8. From the **Sub-Fields List**, indicate the sub-field or sub-fields in which you are presently employed. Please list the code number as well as the sub-field title.

CODE # SUB-FIELD TITLE CODE # SUB-FIELD TITLE

1. _____ __________ 2. _____ __________

9. Please provide the following information concerning your present position. If you are employed in two positions, list your principal position first. NOTE: If the information that you can provide below is no different from that already provided in your mailing address at the top of the page, you may move on to item # 10.

PRINCIPAL POSITION:

(1) ______________________ YOUR TITLE
(2) ______________________ INSTITUTION OR AGENCY
(3) ______________________ BRANCH, DEPARTMENT, OR DIVISION
(4) ______________________ CITY STATE ZIP CODE

SECOND POSITION:

(1) ______________________ YOUR TITLE
(2) ______________________ INSTITUTION OR AGENCY
(3) ______________________ BRANCH, DEPARTMENT, OR DIVISION
(4) ______________________ CITY STATE ZIP CODE

10. Please indicate the total number of hours per week that you *actually* devote to the professional position or positions listed above in item 9. __________

11. Please indicate the approximate percent of the number of hours listed above in item 10 that you devote to each of the following activities.

________% 1. ADMINISTRATION
________% 2. RESEARCH
________% 3. TEACHING
________% 4. OTHER (Please specify) ____________

12. Please list your previous professional positions in chronological order, providing the title of the position, name of institution, and the inclusive dates of employment. If you should need additional space, use item 14 below or attach a separate sheet.

	TITLE	INSTITUTION	DATES FROM-TO
1.			
2.			
3.			
4.			
5.			
6.			

RESEARCH ACTIVITIES:

13. Please indicate from the **Research Areas List** those research areas which are most characteristic of your research activities, both *past and present*. Do *not* list specific projects, but indicate those areas which summarize your major research activities. Please list the code number as well as the research area title. If the **Research Areas List** does not provide an area title relevant to one of your activities, supply your own title, using the code number of the appropriate "other" category. Finally, please check (X) those areas in which you are presently doing research. NOTE: Research is here defined to include historical, philosophical, theoretical-conceptual as well as experimental and other types of empirical studies.

	CODE #	RESEARCH AREA	PRESENTLY ACTIVE IN AREA (CHECK X)
1.			
2.			
3.			
4.			
5.			
6.			

14. Please list below any comments that you may wish to make concerning any items on the questionnaire. Take particular note of your areas of specialization on the **Research Areas List** and suggest any additions which in your judgement are necessary.

SUB-FIELDS LIST

for use with the

National Register of Educational Researchers Questionnaire

Please scan all the sub-field categories listed below for those which may apply to you. Sub-fields have been supplied only for those major fields most commonly associated with educational research. Other major fields have been listed, but sub-fields have not been specified. Please supply your own sub-field categories when necessary.

EDUCATION

001	Adult Education
002	Comparative Education
003	Curriculum and Methods
004	Educational Administration
005	Educational Research
006	Elementary Education
007	Guidance and Counseling
008	Higher Education
009	History of Education
010	International Education
011	Philosophy of Education
012	Pre-school Education
013	Rural Education
014	Secondary Education
015	Special Education
016	Other Education Sub-field (specify)

EDUCATIONAL SUBJECT AREAS

101	Agricultural Education
102	Art Education
103	Business Education
104	Conservation Education
105	English/Literature & Drama
106	Foreign Languages & Literature
107	Geography
108	History
109	Home Economics
110	Hygiene Education
111	Industrial & Technical Education
112	Mathematics
113	Music Education
114	Physical Education
115	Reading
116	Religious Education
117	Science Education
118	Social Studies
119	Vocational Education
120	Other Educational Area Sub-field (specify)

PSYCHOLOGY

201	Clinical Psychology
202	Comparative Psychology
203	Counseling and Guidance
204	Developmental Psychology
205	Educational Psychology
206	Experimental Psychology
207	General Psychology
208	Industrial & Personnel Psychology
209	Mathematics of Resource Use
210	Personality Psychology
211	Physiological Psychology
212	Psychometrics
213	School Psychology
214	Social Psychology
215	Statistics & Probability
216	Theory & Practice of Computation
217	Other Psychology Sub-field (specify)

SOCIOLOGY

301	Applied Sociology
302	Community and Urban Sociology
303	Criminology and Deviance
304	Ecology & Demography
305	Educational Sociology
306	Family
307	General Sociology
308	Industrial Sociology
309	Medical Sociology
310	Research Methodology & Technology
311	Rural-Urban Sociology
312	Social Change & Development
313	Social Conflict
314	Social Organization
315	Sociological Theory
316	Sociology of Religion
317	Other Sociology Sub-field (specify)

OTHER SOCIAL SCIENCES (Specify Sub-Fields)

410	Anthropology
420	Economics
430	Geography
440	History
450	Political Science
460	Speech
470	Other Social Science (specify sub-field)

HUMANITIES (Specify Sub-Fields)

510	Art
520	Language, Literature & Language Arts
530	Music
540	Philosophy
550	Religion
560	Other Humanity (specify sub-field)

PHYSICAL SCIENCES (Specify Sub-Fields)

610	Astronomy
620	Chemistry
630	Engineering
640	Geology
650	Mathematics
660	Meterology
670	Physics
680	Other Physical Science (specify sub-field)

BIOLOGICAL SCIENCES (Specify Sub-Fields)

710	Agronomy
720	Anatomy
730	Animal Husbandry
740	Botany
750	Ecology
760	Entomology
770	Genetics
780	Horticulture
790	Medicine & Surgery
800	Microbiology
810	Nutrition & Metabolism
820	Pathology
830	Pharmacology
840	Physiology
850	Zoology
860	Other Biological Science (specify sub-field)

OTHER MAJOR FIELD

900	(Specify sub-field)

RESEARCH AREAS LIST

for use with the

National Register of Educational Researchers Questionnaire

The list of research areas provided below is to be used in connection with questionnaire item No. 13, requesting the identification of your research activities. This list is conceived as a comprehensive set of research topics, each of which may be approached from the standpoint of any of the major academic disciplines related to education. You will therefore find no special sections of the list devoted exclusively to such traditional academic areas as the history of education, philosophy of education, psychology of education, sociology of education, etc. Please scan carefully all of the research areas provided to locate those by which you can identify your research activities. If you cannot locate a research area title which adequately identifies one or more of your activities, please supply your own title.

ADMINISTRATION AND ORGANIZATION

001 Accreditations
002 Admissions
003 Administrative goals
004 Integration
005 Inter-agency relationships
006 Leadership development
007 Materials and supplies
008 Organizational patterns of educational institutions
009 Personnel employment practices
010 School calendar and scheduling
011 School finance
012 School plant
013 School-community relationships
014 Staff relations
015 Student services: health, financial aid, etc.
016 Transportation
017 Other administration and organization research area (specify)

CURRICULUM

101 Curricular goals and standards
102 Pre-school curricula
103 Elementary curricula
104 Secondary curricula
105 Junior college curricula
106 Vocational-technical school curricula:

Higher educational curricula:
Educational specialist curricula:
107 Administrator education
108 School-counselor/psychologist education
109 Teacher education
110 Other educational specialist (specify)
120 Liberal arts curricula
121 Graduate and professional curricula
122 Other higher education curricula (specify)

140 Adult and continuing education curricula
141 Curriculum methodology
142 Other curriculum research area (specify)

EDUCATIONAL RESEARCH AS AN ACTIVITY

201 Development of educational research
202 Dissemination of knowledge and techniques
203 Goals, functions, and dimensions of inquiry in education
204 Techniques of theory building
205 Techniques of experimental and statistical design
206 Training and nurturing of educational researchers
207 Other "educational research as an activity" research area (specify)

GOALS AND FUNCTIONS OF EDUCATION

300 (Specify sub-topic on the questionnaire)

GUIDANCE AND COUNSELING/ SCHOOL PSYCHOLOGY

401 Development of guidance and counseling services
402 Goals and functions of guidance and counseling
403 Personnel training and working conditions (see Personnel section)

Student problems:
404 Absenteeism
405 Academic achievement and records
406 Delinquency: character rehabilitation
407 Drop-outs
408 Emotional disturbances
409 Job opportunities
410 Therapeutic practices
411 Vocational counseling and placement
412 Other student problems research area (specify)

430 Other guidance and counseling research area (specify)

HISTORICAL DEVELOPMENT OF EDUCATION

500 (Specify the research area from other topics provided on this list. When necessary supply your own area title.)

Research Areas List continued on reverse side

Research Areas List (continued)

PERSONNEL

601 Academic freedom
602 Biographical studies of educational personnel
603 Characteristic roles and behaviors of educational personnel
604 Employment practices and working conditions
605 Interrelations among educational personnel
606 Professional training and qualifications
607 Other personnel research area (specify)

THE TEACHING-LEARNING PROCESS

Individual behaviors and characteristics of teachers and students:

701 Cognitive behavior
702 Communicative behavior
703 Creative behavior
704 Emotional behavior
705 Interpersonal relationships
706 Learning behavior
707 Perceptual behavior
708 Social behavior
709 Other (specify)

Special student groups:

720 Blind and partially seeing
721 Crippled
722 Deaf and hard of hearing
723 Emotionally disturbed or socially maladjusted
724 Gifted
725 Mentally retarded
726 Special health problems
727 Speech impaired
728 Other (specify)

Factors influencing individual behaviors:

730 Classroom conditions
731 Home environmental factors
732 Attitudes
733 Achievement
734 Motivation
735 Readiness
750 Social factors
751 Subject matter organization
752 Other factors influencing individual behaviors (specify)

Teaching methods and media:

760 Educational films
761 Tapes and other auditory media
762 Radio
763 Reading
764 Subject matter methods and media
765 Teacher techniques
766 Teaching machines and programmed learning
767 Textbooks
768 Television
769 Other teaching methods and media (specify)

780 Other teaching-learning process research areas (specify)

TESTING AND MEASUREMENT

801 Goals and functions of testing and evaluation
802 Testing methodology

Types of tests and measurements:

803 Aptitudes
804 Creativity
805 Intelligence
806 Other (specify)
820 Achievement
821 Admissions
822 Emotional problems
823 Interests or ambitions
824 Motivation
825 Personality
826 Placement
827 Readiness
828 Reading
829 School adjustment
830 Subject matter tests
831 Vocational choice
832 Other types of tests (specify)

850 Other testing and measurement research area (specify)

OTHER EDUCATIONAL RESEARCH AREA

900 (Specify)

APPENDIX B

SAMPLING STRATEGY AND IMPLEMENTATION

The objectives of the sampling strategy were (1) to identify all of the diverse populations, and (2) to discover all of the various types of projects which existed within the programs selected. Since it could not be known in advance which populations and types of projects were unique, it was assumed all populations and every type of project in every program were unique and, consequently, all of them were sampled. The extent of sampling was determined at the time the data were gathered, the practice followed being that the sampling of a given population or type of project was continued until the project staff were satisfied an accurate picture had been obtained.

While the sampling strategy was applied uniformly across programs, the specific sample drawn from each program was not uniform. There were several reasons for this lack of uniformity. In some instances (footnoted in Table 96), discussions with program personnel about the emphases being pursued indicated a body of contracts was directed toward objectives which were tangential to educational R, D, and D, e.g., the training of a corps of persons as machine operators. After examination of four or five approved proposals confirmed the tangential nature of the contracts, no further sampling was undertaken.

Small grants were not sampled in all programs. After 44 small grants had been examined, it was found the smallness of the funds involved required the personnel demands to be similar regardless of the objectives of the project.

In a few cases, the proposal format was so regulated that the proposals accepted were uniform in their demand for personnel (e.g., the Research Coordinating Units and Instructional Materials Centers). After examination of a few proposals confirmed that condition, no further sampling was undertaken.

Where the number of new contracts in a branch approached 20 in number, the proportion sampled was usually reduced (1) because experience indicated little was being added to the description of the program already obtained, and (2) because of the need to accommodate the time of the people taking the sample.

Finally, some strange samplings (e.g., eight of nine R and D centers) resulted simply because not all of the proposals were available at the time the project staff were at the Office of Education.

Table 96, which follows, depicts the number of new contracts in each organizational unit and the number sampled.

TABLE 96. NEW CONTRACTS IN FY '66 AND NUMBER INCLUDED IN PROJECT SAMPLE

Sub-units included under each agency, bureau, division, and branch	Number	
	New contracts	New contracts in sample
OE BUREAU OF RESEARCH		
Division of Elementary and Secondary Research		
Research Branch		
Small grants	65	12
Regular grants	51	18
Curriculum and Demonstration Branch		
Small grants	13	0[a]
Regular contracts	17	17
Handicapped Children and Youth Branch		
Small grants	16	0[a]
Regular contracts	18	9
Demonstration grants	10	5[b]
Programatic grants	2	2
Instructional Materials Centers	8	4[b]
Division of Higher Education Research		
Research Branch		
Small grants	39	19
Regular contracts	25	12
Curriculum Branch		
Small grants	17	13
Regular contracts	11	9[c]

TABLE 96 (continued)

Sub-units included under each agency, bureau, division, and branch	Number	
	New contracts	New contracts in sample
Division of Laboratories and Research Development		
Laboratory Programs Branch	19	19
R and D Center Programs Branch	9	8[c]
Division of Adult and Vocational Research		
Employment Opportunities Branch		
Small grants	9	0[a]
Regular contracts	20	4[d]
Training contracts	6	5[d]
Experimental-development-pilot contracts	5	1[d]
Human Resources Development Branch		
Small grants	16	0[a]
Regular contracts	24	5[d]
Training contracts	3	2[d]
Experimental-development-contracts	6	6
Conference contracts	2	0[d]
Educational Resources Development Branch		
Small grants	24	0[a]
Regular contracts	8	8
Training contracts	30[e]	5[c]
Experimental-development-pilot contracts	9	9
R and D centers	2	2
Research development units	5	1[c]
Research coordinating units	25	5[b]

TABLE 96 (continued)

Sub-units included under each agency, bureau, division, and branch	Number	
	New contracts	New contracts in sample
Division of Research Training and Dissemination		
Educational Research Information Center		
Service contracts	2	2
Information science contracts	12	2[d]
Clearing houses	17	16[c]
OE BUREAU OF ELEMENTARY AND SECONDARY EDUCATION		
Division of State Agency Cooperation		
State Agency Support Branch		
Section 503 grants	418[f]	21
Section 505 grants	14[g]	2
Division of Plans and Supplementary Centers		
Innovative Centers Branch		
Planning grants	597[h]	19
Operational grants	488[i]	22
NATIONAL SCIENCE FOUNDATION, EDUCATION UNIT		
Division of Pre-College Education in Science		
Pre-College Course Content Improvement	12	6

Note: Footnotes to Table 96 are presented on the following page.

[a] Examination of small grants was curtailed after it was found their personnel demands were uniform regardless of their objectives.

[b] These proposals were so regulated that, in effect, all the proposals were uniform. No further sampling was undertaken after examination of a few proposals confirmed this condition.

[c] Not all proposals were examined because some were unobtainable at the time the project staff were at the Office of Education.

[d] The major thrust of these contracts was found, after examination of a few proposals, to be tangential or irrelevant to the demand for educational R, D, and D personnel.

[e] A project inspection of these contracts found only six directed toward R, D, and D.

[f] USOE supported 418 proposals in FY '66, but inspection of all of them by the project staff found just 38 to be directed toward educational R, D, and D. Twenty-one of the 38 were examined.

[g] Fourteen proposals were supported by USOE in FY '66, but an inspection of all 14 by the project staff found just two to involve R, D, and D purposes, and both were examined.

[h] The USOE supported 597 planning grants in FY '66, but, as the results of the survey reported in Chapter IV indicate, most did not involve educational R, D, and D. The project survey indicated perhaps eight percent (or 48) of the total may have involved R, D, and D.

[i] The USOE supported 488 operational grants in FY '66, but the project survey reported in Chapter IV indicated only eight percent (or 39) of the total may have involved R, D, and D.

APPENDIX C

PERSONS INTERVIEWED REGARDING MANPOWER DEMANDS AND EMERGING ROLES

The persons interviewed regarding manpower demands and emerging roles are classified below as being (1) personnel at the office level, (2) those at the bureau level, (3) those at the division level, (4) those at the branch level of the USOE (unless otherwise indicated) or NSF, (5) administrators of operating units such as R and D centers, (6) participants in the Conference on Emerging Roles, and (7) others, including national advisory board members, representatives of the Bureau of the Budget, and representatives of private foundations.

Office Personnel

1. Wayne Reed, Associate Commissioner for Federal-State Relations (two interviews)
2. Joseph Froomkin, Office of Program Planning and Evaluation
3. Harry Piccariello, Office of Program Planning and Evaluation

Bureau Personnel

1. Ralph Flynt, Associate Commissioner for Higher Education
2. R. Louis Bright, Associate Commissioner for Research
3. Arthur Harris, Associate Commissioner for Elementary and Secondary Education
4. Hendrik Gideonse, Director of Program Planning and Development (two interviews)
5. David Pollen, Deputy Associate Commissioner for Research

Division Personnel

1. Robert Hopper, former Director, Division of State Agency Cooperation
2. Harry Phillips, Director, Division of State Agency Cooperation (two interviews)

3. James Moss, Director, Division of Research, Bureau of Education for the Handicapped
4. Ralph Becker, Director, Division of Plans and Supplementary Centers (two interviews)
5. David Bushnell, Director, Division of Comprehensive and Vocational Education Research
6. Andrew Molnar, Acting Director, Division of Higher Education Research
7. Howard Hjelm, Director, Division of Elementary and Secondary Education Research (three interviews)
8. Norman Boyan, Director, Division of Educational Laboratories
9. Lee Burchinal, Director, Division of Information Technology and Dissemination (three interviews)
10. James Gillis, former Acting Director, Division of Educational Laboratories
11. Robb Taylor, former Director, Division of Higher Education Research (two interviews)
12. J. Ned Bryan, former Director, Division of Elementary and Secondary Curriculum (two interviews)
13. Paul Messier, Director, Division of Regional Research
14. Arno Jewett, former Director, Division of Higher Education Curriculum (two interviews)

Branch Personnel

1. Duane Neilsen, Director Organization and Administration Studies Branch, Division of Comprehensive and Vocational Education Research (two interviews)
2. Bernard Yabroff, Director, Career Opportunities Branch, Division of Comprehensive and Vocational Education Research
3. Alice Scates, Director, Basic Studies Branch, Division of Comprehensive and Vocational Education Research
4. Andrew Molnar, Director, Instructional Materials and Practices Branch, Division of Higher Education Research
5. David Goldberg, Director, Organization and Administration Studies Branch, Division of Higher Education Research
6. Richard Harbeck, Director, Research Training Branch, Division of Higher Education Research

7. John Colby, former Director, Research Training Branch, Division of Information Technology and Dissemination (two interviews)

8. Harvey Marron, Director, Educational Research Information Center, Division of Information Technology and Dissemination
9. Harold Haswell, former Director, Educational Research Information Center, Division of Information Technology and Dissemination (two interviews)
10. Thomas Clemens, Research Utilization Branch, Division of Information Technology and Dissemination
11. Richard McCann, Director, Laboratory Branch, Division of Educational Laboratories
12. Ward Mason, Director, R and D Centers Branch, Division of Educational Laboratories (two interviews)
13. James Mauch, Director, Programs Branch, Division of Compensatory Education
14. James Gibbs, Director, Consultive Services Support Branch, Division of State Agency Cooperation
15. Max Mueller, Acting Director, Projects and Program Research Branch, Division of Research for the Handicapped
16. Charles Whitmer, Head, Student and Curriculum Improvement Section, Pre-College Education in Science Division, NSF
17. Laurence Bender, Program Director, Course Content Improvement Section, Pre-College Education in Science Division, NSF

Operating Unit Personnel

1. James Becker, Director, Research for Better Schools, Inc.
2. Robert Glaser, Director, Learning R and D Center, University of Pittsburgh
3. Malcolm Provus, Director of Research, Pittsburgh Public Schools
4. Daniel Stufflebeam, Director, the Evaluation Center, Ohio State University
5. Edward Towers, Director, Industrial Arts Course Content Improvement Project, Ohio State University
6. Gene Howard, Director, Innovation and Dissemination Division, Project IDEA, Kettering Foundation

7. C. Mauritz Lindvall, Professor and Chairman of Educational Research and Director of a research training program, University of Pittsburgh
8. Richard Cox, Assistant Professor of Education and Co-Director of a research training program, University of Pittsburgh
9. Harry Sparks, State Superintendent of Public Instruction, Kentucky

Conference Participants

1. J. Richard Suchman, Science Research Associates
2. Max Goodson, Director, Center for Research and Development for Learning and Re-Education, University of Wisconsin
3. Keith Goldhammer, Director, Center for the Advanced Study of Educational Administration, University of Oregon
4. Joseph Dionne, General Manager, California Test Bureau, A Division of McGraw-Hill Book Company, Dee Monte Research Park, Monterey, California
5. Edward Towers, Director, Industrial Arts Curriculum Project, Ohio State University
6. William Gephart, Director of Research, Phi Delta Kappa
7. Merlin Wittrock, Director, Center for the Study of the Evaluation of Instructional Programs, University of California
8. Frederick Bertolaet, Professor of Education, University of Michigan, Ann Arbor, Michigan
9. Fay Starr, Assistant Director, Central Midwestern Regional Educational Laboratory
10. Arliss Roaden, Assistant Director, School of Education, Ohio State University
11. Mary Jane Duda (Mrs.), Research Division, Pittsburgh Public Schools
12. Leonard L. Silvern, Vice President, Education and Training Consultants, 979 Peakwood, Los Angeles, California
13. Thomas Clemens, Research Utilization Branch, Division of Information Technology and Dissemination, USOE

Other Personnel

1. Edward Mead, Fund for the Advancement of Education
2. Raymond Miller, Kettering Foundation

3. Robert Breeve, Kettering Foundation
4. Emerson Elliot, Bureau of the Budget
5. Charles Kettering, ESEA Title III Advisory Board (by telephone)
6. James Hazlett, ESEA Title III Advisory Board (by telephone)

APPENDIX D

BASES FOR FUNDING PROJECTIONS

Each of the funding projections in Chapter III springs from an existing funding base. Substantiation for use of a particular funding base was not offered in Chapter III because of the additional complexity it introduced to an already cumbersome and intricate presentation. Instead, the source data and details of compilation for the three year period FY '66-'68 were brought together in this Appendix and are presented in Table 97.

TABLE 97. FUNDING SUPPORT FOR EDUCATIONAL R, D, AND D (FY '66-'68), BY SUB-UNITS[a] ($ IN THOUSANDS)

Sub-Units	FY '66	FY '67	FY '68
PROGRAMS			
R and D Centers			
Division of Educational Laboratories	$ 6,791	$ 8,254	$ 8,100
Vocational Education	1,000	1,965[b]	2,225
National	--	1,500	1,700
Handicapped Children and Youth	--	--	470
Policy Study Centers	--	402[b]	1,000
Instructional Materials Centers	1,000[d]	1,275	2,751
Educational Laboratories	8,025	17,800	23,800
Clearing Houses	1,541	2,279	2,172

TABLE 97 (continued)

Sub-Units	FY '66	FY '67	FY '78
Research Coordinating Units	$ 2,152[d]	$ 1,871[b]	$ 1,052
State Department Research Divisions	11,250[e]	17,645[b]	25,287
PROJECTS			
Research			
Small	1,671[f]	1,671[g]	1,518[g]
Regular	22,810[h]	17,227[i]	22,338[j]
Development and Diffusion			
Small	651[f]	651[g]	590[g]
Regular	13,397[h]	10,118[i]	7,619[j]
Special	--	--	5,500[j]
Title III	75,000	135,000[b]	209,000
NSF Course Content Improvement	10,390	11,687	13,500
TOTAL			

Note: Footnotes to Table 97 are presented on the following pages.

TECHNICAL NOTES TO ACCOMPANY TABLE 97

[a] Unless noted otherwise, data for FY '66 and '67 are expenditure data and for FY '68 are appropriations data as furnished to the project staff by division, branch, or program personnel.

[b] Appropriation data, provided by division personnel.

[c] Based on a project survey of approved budgets. There were eight IMC's in FY '66 funded at an average level of $125,000.

[d] Based on a project survey of approved budgets. There were 25 RCU's in FY '66 funded at an average level of $ 86,000.

[e] Expenditure data from Focus on the Future: Education in the States, Appendix B, Third Annual Report of the Advisory Council on State Departments of Education, U. S. Office of Education, Washington, D.C., March, 1968, pp. 96-97.

[f] Small projects from DESR, DHER, and DCVR in the Bureau of Research, and the Division of Research in the Bureau of Education for the Handicapped, are included here. The datum on total funding for small projects in FY '66 was supplied (7/68) by the Regional Research Program administrator in a page titled "Small Project Research," dated July 15, 1968. The proportion of the total $2.3 million to be allocated to "Research" and to "Development and Diffusion" was determined by a project-by-project analysis of 26 of 53 FY '66 grants in DHER, and 12 of 78 in DESR. None of the 49 small projects in DCVR or 16 in HCY were examined, because the similarity of the personnel requirements called for in the small grants was apparent by then. The projects were categorized as "R" or "D and D" by their activity and purpose, using definitions developed for this study.

The projects in the sample were then extrapolated to the whole program. The proportions obtained independently for small and regular research projects in those divisions where both types were sampled were very similar, as shown on the following page.

Percent of personnel employed in R, D, and D

	Small projects		Regular projects	
	R	D and D	R	D and D
DESR	100		100	
DHER				
Research Branch	94	6	100	
Curriculum Branch	33	66	31	69

In those divisions where no small grants were sampled (DCVR and HCY), then, the proportion of "R" to "D and D" projects obtained for the regular projects was applied to the small projects.

The extrapolated figures were then summed to obtain the overall proportion of "R" to "D and D" projects supported by the $2.3 million. The proportion obtained were 72 percent Research and 28 percent Development and Diffusion, and the $2.3 million was apportioned accordingly.

[g] Total expenditures by Regional Research Program in FY '67 and appropriations for FY '68 supplied by Budget and Accounting Office, Bureau of Research (7/68). That amount was redistributed to "Research" and to "Development and Diffusion" using FY '66 percentages (i.e., 72 percent and 28 percent, respectively).

[h] Included here are expenditures in DESR, DHER, and DCVR of (1) $19.1 million in CRP funds labeled "General Education," $1.8 million from "Media Research," and $1.9 million reallocated internally by the Bureau of Research for "Development and Demonstration;" (2) Vocational Education Act of 1963 expenditures of $8.5 million; and (3) $4.9 million under P. L. 88-164, Section 302 (handicapped research).

The proportion of CRP funds used in FY '66 by the three divisions for project support was reconstructed by utilizing (1) CRP expenditure totals for FY '66 under "General Education," "Media Research," and "Development and Demonstration," and (2) a detailed breakdown of divisional expenditures under these headings for FY '67 - both furnished (7/68) by the B. R. Budget and Accounting

Office. Proportionate CRP expenditures of the divisions in FY '67 were applied to the known FY '66 total CRP expenditures to arrive at a distribution of CRP funds for FY '66 project support among DESR, DHER, DCVR and other divisions of the Bureau.

Project support in DCVR from Vocational Education Act of 1963 funds was derived by subtracting known categorical expenditures (RCU's, RDU's, R and D centers, and small projects) from the total appropriation for FY '66.

The total of handicapped project support from P. L. 88-164 funds was also derived by subtracting known categorical expenditures (instructional materials centers and small projects0 from the total appropriation in FY '66.

The distribution of funds available for project support between research projects, on one hand, and development and demonstration projects, on the other, was obtained by a project-by-project analysis of a sample of new projects in FY '66. Projects examined were: in DESR, 35 of 68 new projects were analyzed; in DHER, 12 of 25; in DCVR, 45 of 113 (including 17 of 52 regular projects, 16 of 20 experimental-development-pilot projects, and 12 of 39 training projects--and two conference projects not examined bring the total to 113); and in HCY, 16 of 30 new projects. The projects were assigned to either the "Research" or the "Development and Diffusion" categories by project purpose and activity, using the definitions developed for this study.

The projects categorized were extrapolated to the whole program according to the proportion sampled. The extrapolated figures were then summed to obtain the proportion of "Research" and "Development and Diffusion" projects supported by the $32.6 million available for that purpose in FY '66. The proportions derived were 63 percent research and 37 percent development and diffusion projects, and the $32.6 million was apportioned accordingly.

[i] The Bureau of Research Budget and Accounting Office furnished (7/68) a detailed breakdown of Bureau expenditures for project support in FY '67. HCY personnel supplied fimilar data for their program. The combined total of the two programs was apportioned between "R" and "D and D" using the percentages derived for FY '66.

[j] Project staff obtained appropriations data for project support in FY '68 through interviews with division personnel (7/68). The funds available were apportioned

to "R" and "D and D" using the percentages derived for FY '66, after $5.5 million of the "D and D" funds were removed and categorized as "special" project money to support the Teacher Education and ES-70 project.

APPENDIX E

FOUNDATION SUPPORT FOR R, D, AND D ACTIVITIES IN EDUCATION, 1962-1968

To obtain an indication of private foundation support of educational R, D, and D activities, the listings of foundation grants in Foundation News were tabulated. The reader needs to know at the outset that the tabulation consistently underestimated actual foundation activity in educational R, D, and D during the period covered in the analysis. There were two reasons for this underestimation: (1) "the Foundation News records are not complete because they list only those grants about which they receive information either from donor foundations, public records, or news reports, and (2) grants of less than $10,000 and renewal grants were not listed. Inasmuch as there is probably an inverse relationship between grant size in dollars and the frequency of such grants, it is reasonable to assume that a large number of grants were left unmentioned; collectively they may have represented a substantial addition to the foundation funds available to support R, D, and D activity in education.

Another limitation of this analysis stemmed from the parsimonious listing in Foundation News of information on the nature of each grant. The majority of grants listed were discovered to be clearly appropriate or clearly inappropriate for inclusion as R, D, or D support, but there were a substantial number where this was not the case. The inclusion-exclusion decisions made for these latter listings may have injected an error factor of as much as 20 percent into the conclusions reached.

Procedures

Eleven May or November "education" issues of Foundation News contained the listings from which this analysis was drawn, covering the period from approximately November, 1962, to May, 1968. Using the data contained in the listings, the project staff (1) tabulated the number of foundations, the number of grants, and the amount of the grants; (2) ranked the "top ten" foundations in terms of (a) the number of grants awarded, (b) the amount of funds awarded, and (c) a combination of number of grants and amount of funds; (3) tabulated the grants awarded according to their research, development, or diffusion emphasis, and (4) tabulated the grants according to the institutional settings of the recipients. No further analysis or projection was attempted because of the limitations of the data already described.

Foundations and Grants

Fifty-six foundations were identified as donors of 434 grants totaling $62,964,000 during the period. During any given year, between 30 and 35 foundations would be active; there was no pattern apparent in the way foundations moved in and out of educational R, D, and D supporting activity from year to year.

"Top Ten" Foundations

The top ten foundations in terms of (1) number of grants and (2) amount of funds awarded are listed below.

Rank	Foundation	Number of grants
1	Carnegie Corporation of New York	106
2	Ford Foundation, New York	68
3	Kettering Foundation	29
4	Fund for the Advancement of Education	25
5	Danforth Foundation	22
6	Hill (L. W. and M.) Family Foundation	19
7	Sloan (A. P.) Foundation, New York	14
8	Lilly Endowment, Indiana	12
9	Kellogg (W. K.) Foundation	11
10	Educational Facilities Laboratories, N. Y.	10
10	Rockefeller Foundation, New York	10

The Kettering and Danforth foundations were the most recent (i.e., last two years) entrants to the top ten foundations in terms of the number of grants listed for educational R, D, and D.

Rank	Foundation	Amount of funds ($ in millions)
1	Ford Foundation, New York	$ 19.4
2	Carnegie Corporation, New York	16.2
3	Kellogg (W. K.) Foundation	6.2
4	Danforth Foundation	5.2
5	Kettering Foundation	3.5
6	Fund for the Advancement of Education	2.7
7	Sloan (A. P.) Foundation, New York	1.9
8	Snow (J. B.) Foundation, New York	1.0
9	Lilly Endowment, Indiana	.7
10	Hill (L. W. and M.) Family Foundation	.6

The Kellogg and Sloan foundation grants listed diminished considerably during the past two years; the Danforth grants increased substantially.

To get an overall ranking of the foundations, the numerical ranks of the foundations in each list were summed. (When a foundation appeared in one list only, its obtained rank was added to the value of 11 in order to arrive at a quantitative value for the combined list presented below.

Combined Rank	Foundation
1	Carnegie Corporation of New York
1	Ford Foundation, New York
3	Kettering Foundation
4	Danforth Foundation
5	Fund for the Advancement of Education

8

Combined Rank	Foundation
6	Kellogg (W. K.) Foundation
7	Sloan (A. P.) Foundation, New York
8	Hill (L. W. and M.) Family Foundation
9	Lilly Endowment, Indiana
10	Snow (J. B.) Foundation, New York

R, D, and D Emphases

Grants which bridged R, D, and D functions were tabulated under more than one heading, so the total is greater than the number of grants reported earlier. The result of the tabulation was as follows:

Function	Number of grants
Research	209
Development	217
Diffusion	44

During the past two years, the proportion of grants listed for research purposes declined from 48 percent of the total to 37 percent; development grants remained stable at 45 percent of the total; and diffusion grants grew from 7 percent to 16 percent of the total.

Institutional Settings

During the period under study, foundations awarded just one grant to higher education institutions for each grant awarded any other setting. This is a much lower proportion for higher education than was found for other funding agencies. The institutional setting of four grant recipients could not be determined, so the total presented below is four less than the 434 grants reported earlier.

Institutional settings	Number of grants
Colleges and Universities	218
State Departments of Education	9
Other State Agencies	9
Schools and School Systems	46
Private Institutes and Agencies	47
Professional Associations	48
Inter-Agency Organizations	30
Business and Industrial Organizations	9
Others (International education, other federal, etc.)	14
Total	430

The sole trend discerned was that grants to business and industrial organizations continuously diminished until none were granted during the final year of the study.

APPENDIX F

A RE-ANALYSIS OF NORMATIVE DATA FROM THE NATIONAL REGISTER OF EDUCATIONAL RESEARCHERS: CAREER PATTERNS OF RESEARCHERS IN EDUCATION WITH IMPLICATIONS FOR RECRUITMENT

This paper was designed originally to re-analyze data which might yield information that would have implications for recruitment practices. Specifically, an attempt was made to identify manpower pools susceptible to recruitment efforts by looking at the career patterns of persons now in educational research. In the process of achieving this objective, a sub-study was conducted which shifted attention from recruitment to an aspect of the structure of preparation programs, i.e., the apprenticeship experience in research training programs. The portion of the paper which follows, then, is comprised of two discrete sections. No attempt has been made to integrate them. Indeed, their only relationship lies in the fact that the data reported in each section emanate from the same source, and that each section addresses itself, in one way or another, to the general question of preparation for R, D, and D activities.

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[1] This appendix was prepared by Blaine R. Worthen, Assistant Professor at The Ohio State University.

Data Source and Sample

The data in this study were derived from a reanalysis of 1,755 autobiographical reports from among over 5,000 such reports received by Bargar, *et al.* from persons who identified themselves with the educational research community, and whose names were therefore included in the *National Register of Educational Researchers.*[2] The autobiographical reports were in the form of written responses to a printed questionnaire. Because this questionnaire was originally designed for other purposes (collecting information for the *National Register*), only a small proportion of the responses on each questionnaire had any relevance for this analysis. The pertinent information took two forms, The first was census-type data, including sex, present position, percentage of time spent on research, and major area and date of highest degree. The second type was a sequential listing of previous professional positions, including position title, name of institution, and inclusive dates of employment.

Both types of data were used in the analysis. The previous-employment data were analyzed to develop the career pattern exemplars, while the census data provided supplementary descriptions of the "typical" researcher to follow each of the differing patterns. Both types of data contributed to the results reported in the section dealing with the research assistantship.

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[2] Bargar, R. R., Guba, E. G. and Okorodudu, Corahann, *Development of a National Register of Educational Researchers*, The Ohio State University Research Foundation, Columbus, Ohio, 1965.

The 5,121 autobiographical reports were submitted to two sorting processes. First, all "minimal-research personnel" (those who devoted less than 20 percent of their total professional time to research) were excluded. Second, the remaining questionnaires were sorted into 16 categories on the basis of the major position of the respondent. The primary criterion used in this sorting process was that assignment to categories be unequivocal. Any respondent who could not readily be assigned to one, and only one, category, was excluded from the analysis. Each of the resultant categories was occupied by persons who were alike in type of position and general institutional setting.[3] Because of these restrictions, the categories used in this study represent only a selection from among the various individual educational research and research-related positions which currently exist. However, they do represent the major position types in the field.

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[3] One exception was the "stimulator-coordinator" category, which included respondents from widely divergent institutional settings (e.g., USOE, colleges of education, private foundations, etc.) The only criterion for inclusion here was that the respondent be identified as playing a facilitative role in stimulating or coordinating research activities.

On the basis of the two criteria for exclusion (less than 20 percent time devoted to research, or inability to classify respondent unequivocally), 3,366 persons who had responded to the National Register questionnaire were excluded. The remaining 1,755 persons were distributed among the 16 categories as shown in the right column of Table 98.

The left column in Table 98 needs additional explanation. In analyzing the data from the 1,755 selected respondents, a relationship began to emerge between research assistantship experience and percent of time currently spent in research.[4] In an attempt to test the extension of this relationship, all "minimal-research personnel" excluded in the earlier sort were reconsidered. They were sorted into the same 16 categories, again excluding questionnaires which could not be categorized unequivocally. In addition, several clearcut position categories emerged which had not been present in the earlier sort (e.g., public school teacher). Persons in these categories were also excluded. As a result, a relatively smaller proportion of the total group of "minimal researchers" appears in Table 98 than is true for their counterparts spending over 20 percent of their time in research.

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[4] This relationship is discussed in detail in the later section, which deals with the research assistantship question.

TABLE 98. DISTRIBUTION OF SAMPLE IN POSITION CATEGORIES

Category	No. devoting 0-19% of time to R, D, and D	No. devoting 20-100% of time to R, D, and D
RESEARCH DIRECTORS		
Public Schools	8	84
State Education Agencies	3	23
Professional Associations	3	36
Private Research Agencies	21	44
University and College Institutional Research Units	9	31
University and College Research Programs	6	93
University and College Research Projects	0	72
University and College Bureaus of Educational Research	4	38
RESEARCH STAFF		
Public Schools	10	29
Private Research Agencies	30	68
University and College Research Programs	5	63
STIMULATOR AND COORDINATOR	32	27

TABLE 98 (continued)

Category	No. devoting 0-19% of time to R, D, and D	No. devoting 20-100% of time to R, D, and D
INDIVIDUAL RESEARCH PERSONNEL--UNIVERSITIES AND COLLEGES		
Departments, Schools, and Colleges of Education	440	596
Departments and Schools of Psychology	155	274
Other Behavioral and Social Science Departments	92	183
Other Discipline and Academic Departments	76	94
TOTAL	894	1,755

Analysis Procedures

The two types of data used in this analysis required different analytic modes. The census data were tallied for each of the 16 categories and summarized in tables which appear in the appropriate sections. Several standard chi-square tests of significance were run on these data, and the obtained values, reported in the appropriate sections, were used to help interpret the results.[5] The previous employment data necessitated a more complex tabulation system which took into account (a) sequency of positions, (b) length of time employed in each category, and (c) date of highest degree in relation to position sequence. In extracting these data from the questionnaires, it quickly became apparent that most respondents had occupied intermediate positions other than the 16 terminal positions on which the categories are based. For example, the positions of public and private school teachers had been virtually eliminated from the sample when "minimal-research personnel" were excluded. The position of teacher reappeared as the most frequent transitory position through which persons in the 20-100 percent group passed enroute to their terminal positions in the sixteen categories. Several such generic position types were of necessity included as intermediate steps in the analysis of career patterns reported later. Listings and definitions of these position types appear in a later section.

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[5] Matrices analyzed by the use of the chi-square (χ^2) technique ranged from a 2 x 3 matrix to a 4 x 16 matrix. With such matrices, given a significant omnibus χ^2, no good, precise statistical method is available to enable specific

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determinations as to which categories contribute most to the obtained χ^2 value. The calculating of each of the possible inter-category χ^2 values is unacceptable, since such a technique runs into problems of non-independence and unknown inflation of the chosen α level.[1] An inspection of the weighted squared discrepancies between obtained and expected cell frequencies ($\frac{(O-E)^2}{E}$), coupled with the direction of the difference, gives a good indication of where the most significant differences between categories lie. It is this technique which has been adhered to in all analyses reported in this paper.

No tests of statistical significance were conducted on career pattern data. Individual career patterns were charted, over time, across position types. Total frequencies and percentages of shifts among categories, over time, were also used to aid in the identification of career patterns which are reported in the section which follows.

A sub-analysis was also conducted within each position category to explore differences in career pattern development before and after 1956. These analyses were summed across categories to test the impact on career pattern development of the availability of research funds to researchers in education under the Cooperative Research Program (CRP) of the USOE after 1956.

Common Career Patterns in Educational Research

Previous "career" studies of researchers typically have not dealt with career patterns _per se_. Rather, they have focused either on (a) the relationship of cultural and personality factors to career choice,[6] or (b) the relationship of formal research training programs to later productivity, etc.[7] Neither approach has poved to be especially helpful to persons attempting to recruit researchers. The first approach is not fruitful because it deals with information typically not available to recruiters. The second focuses only on truncated "post-training" career patterns and, thus, fails to direct student recruitment efforts.

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[6] Ginzberg, Eli, _et al._, _Occupational Choice, An Approach to a General Theory_, Columbia University Press, New York, 1951; Hull, Albert Wallace, "Selection and Training of Students for Industrial Research," _Science_ 101: 157-160, February 16, 1945; Kubie, Lawrence S., "Some Unsolved Problems of the Scientific Career," _American Scientist_ 41: 596-613, Oct., 1953; Roe, Anne, _The Making of a Scientist_, Dodd, Mead and Company, New York, 1953; Super, Donald E., "Career Patterns as a Basis for Vocational Counseling," _Journal of Counseling Psychology_ 1: 12-20, January, 1954; Super, Donald Edwin, and Bachrach, Paul B., _Scientific Careers and Vocational Development Theory_, Teachers College, Columbia University, New York, 1957.

In this re-analysis of normative data, career patterns for selected educational research positions were analyzed. A career pattern was operationally defined as a sequence of occupational positions. Although not prescriptive, the descriptive career pattern exemplars presented in this paper might be employed pragmatically in at least two ways by persons involved in recruitment and training. Each use is briefly outlined below.

First, numerous attempts are afoot to define more precisely what is meant by "research and research-related roles" and to differentiate the functional emphases of occupants of these diverse roles. A major goal of such differentiation is to provide information necessary to tailor preparation programs to train persons for each type of research function which is delineated. Ultimately, training programs might exist to provide specific preparation for almost any role in R, D, and D. Each of these programs, however, would be as dependent for success on recruitment as are our more general research programs today. Success in recruiting for specific programs would be enhanced if manpower pools susceptible to recruitment for specific positions might be identified and differentiated by career pattern analysis. Specific career patterns might be examined for cues as to which manpower pool might be most advantageously tapped in order to recruit personnel who are to be trained for specific research roles.

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[7] Buswell, Guy T.; McConnell, T. R.; Heiss, Ann M.; and Knoell, Dorothy M., Training for Educational Research, Cooperative Research Project no. 51074, Center for the Study of Higher Education, University of California, Berkeley, 1966, 150 pp.; Sieber, Sam D., The Organization of Educational Research in the United States, Cooperative Research Project no. 1974, Bureau of Applied Social Research, Columbia University, New York, 1966, 364 pp.

Second, planners of educational training programs might look *across* position categories for emergent trends which would identify general recruitment pools which have previously been only randomly tapped, but which appear to be predisposed toward career patterns leading into research and research-related roles. For example, the great influx of teachers who, by a number of diverse routes, have drifted into educational research in the past decade suggests that it would be uninformed to continue to ignore such a receptive recruitment pool for R, D, and D in the future. Even where specific position career patterns are confused, the quantitative data can be used in this fashion to identify general recruitment sources which cut across position types.

Career Pattern Exemplars

Exemplars for 16 selected positions in educational research appear on the following pages. Each contains a tabular description of occupants of that position, a graphic representation of the most predominant career pattern(s) by which occupants reached their current position,[8] and a brief narrative synopsis of statistically significant deviations of occupants from distribution of expectancies based on chi-square analysis of the group as a whole.

It should be stressed that information contained in each exemplar is that which is most typical of persons in that category. It should not be interpreted as descriptive of all persons in the category. Indeed, in several instances, the career patterns presented represent paths followed by less than 35 percent of the persons in that category, but are presented because of the clarity with which they emerge from a confusing welter of other paths. In each case, the most *predominant* career pattern and descriptive data have been used in developing the profile for each exemplar.

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[8] It should be noted that the career patterns for the 16 exemplars are comprised of initial and intermediate positions that persons had traversed enroute to the terminal position they held at the time they responded to the questionnaire. The six generic position types that were used to encompass these initial and intermediate positions should not be confused with the 16 research positions for which exemplars are presented.

Where more than one clearcut career pattern emerges, both are shown. If the number of persons traversing each route is approximately equal, both paths are represented by solid lines. If considerably more persons follow one of the two, the smaller frequency is represented by a dashed line.

The six generic position types used in the exemplars were, of necessity, broad. A number of specific psitions were subsumed under each generic type, and a *few* such positions are listed below with each generic type to aid the reader in understanding the use of terms.

Public School Teacher (includes the very few private school teachers in the sample)

Public School Administrator (principal, superintendent, supervisor)

Academic Instructor (teaching assistant, instructor, professor, in higher education)

Academic Administrator (department chairman, dean, registrar)

Practicing Psychologist (counselor or clinician in private or public practice)

Research Assistant (graduate assistant in research, pre-doctoral research associate)

Many individual career patterns included positions which were not included in the preceding listing (e.g., bureau director, research project director, and other research positions listed in the 16 position categories). However, these were scattered in such a way as not to fit any pattern. The position types preceding are those which were traversed by large proportions of the sample.

Tables containing the descriptive data and tests of significance used in these exemplars appear immediately after the exemplars on the next 16 pages.

In the first exemplar, the reader will notice public school research directors were much more likely than persons in the overall sample to hold either an Ed. D. or Master's degree, but held significantly fewer Ph. D. degrees. A far greater number than one might expect from the total sample received their professional preparation in the various subject matter disciplines. Also, significantly more directors than expected devoted more than two thirds of their time to research.

State education agency research directors, depicted in the second exemplar, were significantly more likely to have received their professional preparation in education than expected from the total sample.

EXEMPLAR NO. 1. PUBLIC SCHOOL RESEARCH DIRECTORS (N=84)

Characteristics	Percent		Representation of typical career pattern
	Total sample	Public school research directors	
SEX			
Male	85	89	Public school
Female	15	11	teacher
PROFESSIONAL PREPARATION			↓
Education	57	44	
Psychology	20	40	
Sociology	--	9	Public school
Other	23	7	administrator
HIGHEST DEGREE			↓
Ph. D.	27	66	
Ed. D.	39	24	Public school
Master's	33	8	research
Bachelor's	1	1	director
APPRENTICESHIP EXPERIENCE			
Research assistant	28	28	
Non-R A	72	72	
MEAN TIME SPENT IN RESEARCH	50	34	
	Median		
AGE	49	46	

EXEMPLAR NO. 2. STATE EDUCATION AGENCY RESEARCH DIRECTORS (N=23)

Characteristics	Percent		Representation of typical career pattern
	Total sample	State educ. agency research directors	
SEX			
Male	100	89	Public school teacher
Female	--	11	
PROFESSIONAL PREPARATION			↓
Education	78	44	Public school administrator
Psychology	13	40	
Sociology	9	9	
Other	--	7	
HIGHEST DEGREE			↓
Ph. D.	43	66	
Ed. D.	39	24	State education agency research director
Master's	13	8	
Bachelor's	4	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	35	28	
Non-R A	65	72	
MEAN TIME SPENT IN RESEARCH	49	34	
	Median		
AGE	50	46	

Professional association research directors held more Ed. D. and Master's degrees and fewer Ph. D. degrees than expected on the basis of the total sample. Not only were significantly more directors than expected trained in the cognate disciplines, but no persons in this category received their training in psychology or sociology. Significantly more persons spent more than two thirds of their time in research than might be expected from the sample totals.

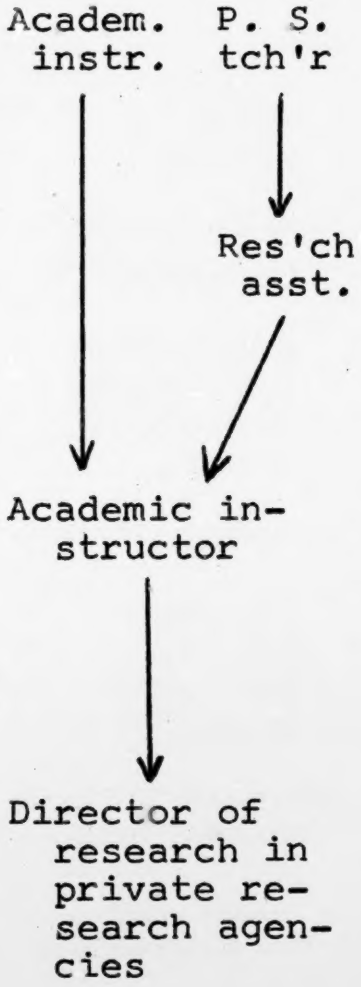
Private research agency research directors deviated significantly from expected frequencies on two dimensions. First, significantly more persons in the category had prior experience as research assistants than sample totals. Second, relatively more had received training as psychologists than had persons in the sample as a whole.

Far fewer higher education institutional research directors had prior experience as research assistants than might be expected.

EXEMPLAR NO. 3. PROFESSIONAL ASSOCIATION RESEARCH DIRECTORS (N=36)

Characteristics	Percent		Representation of typical career pattern
	Total sample	Professional assn. research directors	
SEX			
Male	89	89	Public school teacher
Female	11	11	↓
PROFESSIONAL PREPARATION			
Education	68	44	Public school administrator
Psychology	--	40	↓
Sociology	--	9	
Other	32	7	
HIGHEST DEGREE			
Ph. D.	21	66	
Ed. D.	47	24	Professional assn. research director
Master's	26	8	
Bachelor's	6	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	23	28	
Non-R A	77	72	
MEAN TIME SPENT IN RESEARCH	55	34	
	Median		
AGE	48	46	

EXEMPLAR NO. 4. PRIVATE RESEARCH AGENCY RESEARCH DIRECTORS (N=44)

Characteristics	Percent: Total sample	Percent: Private research agency research dir.	Representation of typical career pattern
SEX			
Male	86	89	
Female	13	11	
PROFESSIONAL PREPARATION			
Education	15	44	
Psychology	79	40	
Sociology	--	9	
Other	4	7	
HIGHEST DEGREE			
Ph. D.	70	66	
Ed. D.	16	24	
Master's	12	8	
Bachelor's	2	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	38	28	
Non- R A	62	72	
MEAN TIME SPENT IN RESEARCH	39	34	
	Median		
AGE	47	46	

Academ. instr.
P. S. tch'r
Res'ch asst.
Academic instructor
Director of research in private research agencies

EXEMPLAR NO. 5. HIGHER EDUCATION INSTITUTIONAL RESEARCH DIRECTORS (N=31)

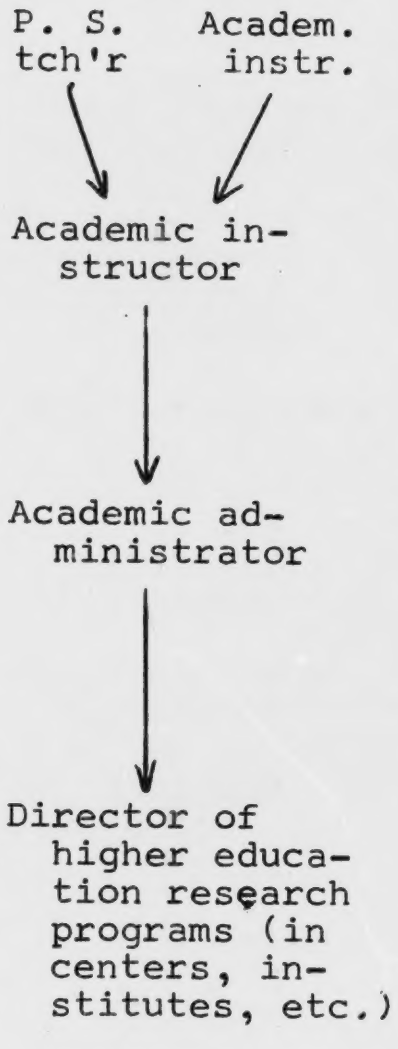
Characteristics	Percent: Total sample	Percent: Higher ed. institutional research dir.	Representation of typical career pattern
SEX			P. S. tch'r ↘ ↙ Academ. instr.
Male	90	89	
Female	10	11	
PROFESSIONAL PREPARATION			Academic instructor
Education	45	44	↓
Psychology	42	40	
Sociology	3	9	
Other	10	7	
HIGHEST DEGREE			Academic administrator
Ph. D.	61	66	↓
Ed. D.	32	24	
Master's	7	8	
Bachelors	--	1	
APPRENTICESHIP EXPERIENCE			Director of higher education research unit
Research assistant	19	28	
Non-R A	81	72	
MEAN TIME SPENT IN RESEARCH	47	34	
	Median		
AGE	45	46	

Directors of research in university and college research programs deviated significantly from expected frequencies on four dimensions. They were more likely than persons across the sample to hold the Ph. D. degree, less likely to have been research assistants, more likely to have received their training in sociology, and fewer than expected were spending less than 20 percent of their time in research.

The most striking deviation from expected frequencies of directors of research projects in institutions of higher education was in research apprenticeship experiences. Far more persons than expected reached the position via the research assistant route.

The only significant deviation of directors of bureaus of educational research was the markedly higher number who received their professional preparation in the field of education.

EXEMPLAR NO. 6. HIGHER EDUCATION RESEARCH PROGRAM DIRECTORS (N=93)

Characteristics	Percent		Representation of typical career pattern
	Total sample	Higher education research program directors	
SEX			
Male	96	89	
Female	4	11	
PROFESSIONAL PREPARATION			
Education	37	44	
Psychology	43	40	
Sociology	18	9	
Other	2	7	
HIGHEST DEGREE			
Ph. D.	82	66	
Ed. D.	11	24	
Master's	3	8	
Bachelor's	4	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	24	28	
Non-R A	76	72	
MEAN TIME SPENT IN RESEARCH	45	34	
	Median		
AGE	47	46	

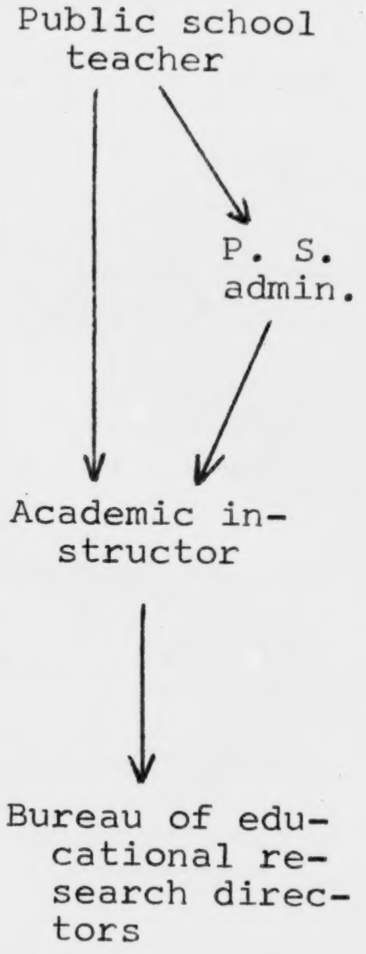
P. S. tch'r
Academ. instr.
Academic instructor
Academic administrator
Director of higher education research programs (in centers, institutes, etc.)

EXEMPLAR NO. 7. HIGHER EDUCATION RESEARCH PROJECT DIRECTORS (N=72)

Characteristics	Percent: Total sample	Percent: Higher education research project directors	Representation of typical career pattern
SEX			Research assistant ↓ Academic instructor ↓ ↑ Project director*
Male	93	89	
Female	7	11	
PROFESSIONAL PREPARATION			
Education	28	44	
Psychology	46	40	
Sociology	15	9	
Other	11	7	
HIGHEST DEGREE			
Ph. D.	70	66	
Ed. D.	22	24	
Master's	7	8	
Bachelor's	1	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	50	28	
Non-R A	50	72	
MEAN TIME SPENT IN RESEARCH	36	34	
	Median		
AGE	44	46	

*Occupants of this category generally held this position concurrently with an academic instructorship, and occupied it for project duration only, moving back to full teaching duties upon termination of the project. Persons in this category tended to repeat project involvement frequently, however.

EXEMPLAR NO. 8. BUREAU OF EDUCATIONAL RESEARCH DIRECTORS (N=38)

Characteristics	Percent		Representation of typical career pattern
	Total sample	Bureau of educ'tl research dirctors	
SEX			 Public school teacher P. S. admin. Academic instructor Bureau of educational research directors
Male	100	89	
Female	--	11	
PROFESSIONAL PREPARATION			
Education	71	44	
Psychology	28	40	
Sociology	--	9	
Other	--	7	
HIGHEST DEGREE			
Ph. D.	71	66	
Ed. D.	26	24	
Master's	--	8	
Bachelor's	3	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	36	28	
Non-R A	64	72	
MEAN TIME SPENT IN RESEARCH	41	34	
	Median		
AGE	49	46	

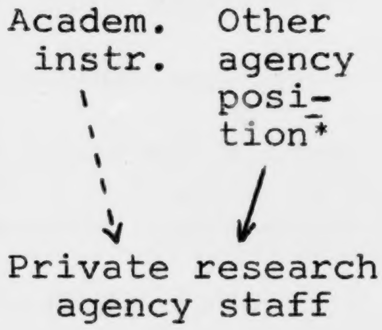
EXEMPLAR NO. 9. PUBLIC SCHOOL RESEARCH STAFF (N= 29)

Characteristics	Percent		Representation of typical career pattern
	Total sample	Public school research staff	
SEX			Public school teacher
Male	76	89	
Female	24	11	
PROFESSIONAL PREPARATION			↓
Education	65	44	
Psychology	34	40	
Sociology	4	9	
Other	7	7	
HIGHEST DEGREE			Public school research staff
Ph. D.	39	66	
Ed.D.	29	24	
Master's	29	8	
Bachelor's	3	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	26	28	
Non-R A	74	72	
MEAN TIME SPENT IN RESEARCH	51	34	
	Median		
AGE	52	46	

Significantly more research staff in private research agencies were trained in psychology than expected from the total sample. Private research agency staff also deviated significantly from expected frequencies in that they were more likely to be spending over two thirds of their time in research, less likely to have held a prior research assistantship, and were more likely than persons across the total sample to hold a Master's degree. The most striking discrepancy, however, was in the number of Ed. D. degree holders; virtually no private research agency staff held the doctorate of education. Many held the doctor of philosophy degree.

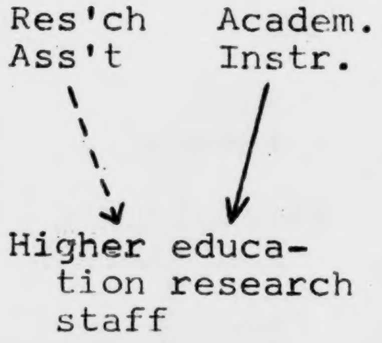
Research staff in higher education research programs deviated significantly from expected frequencies on three dimensions: they were more likely than persons across the sample to be female, to have held a prior research assistantship, and were more likely to be spending more than two thirds of their time in research.

EXEMPLAR NO. 10. PRIVATE RESEARCH AGENCY STAFF (N=68)

	Percent		
Characteristics	Total sample	Private research agency staff	Representation of typical career pattern
SEX			Academ. instr. → Private research agency staff Other agency position* → Private research agency staff
Male	79	89	
Female	21	11	
PROFESSIONAL PREPARATION			
Education	34	44	
Psychology	59	40	
Sociology	6	9	
Other	1	7	
HIGHEST DEGREE			
Ph. D.	69	66	
Ed. D.	1	24	
Master's	30	8	
Bachelor's	--	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	21	28	
Non-R A	79	72	
MEAN TIME SPENT IN RESEARCH	50	34	
	Median		
AGE	41	46	

*These included positions with business, industrial, civic and military institutions, etc.

EXEMPLAR NO. 11. HIGHER EDUCATION RESEARCH PROGRAM STAFF (N=63)

Characteristics	Percent Total sample	 Higher education research program staff	Representation of typical career pattern
SEX			 Res'ch Ass't Academ. Instr. Higher education research staff
Male	63	89	
Female	37	11	
PROFESSIONAL PREPARATION			
Education	29	44	
Psychology	52	40	
Sociology	15	9	
Other	4	7	
HIGHEST DEGREE			
Ph. D.	67	66	
Ed. D.	9	24	
Master's	19	8	
Bachelor's	4	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	37	28	
Non-R A	63	72	
MEAN TIME SPENT IN RESEARCH	64	34	
	Median		
AGE	41	46	

EXEMPLAR NO. 12. RESEARCH STIMULATORS AND COORDINATORS (N=27)

Characteristic	Percent		Representation of typical career pattern
	Total sample	Research stimulators and coordinators	
SEX			Public school teacher ↓ Academic Instructor ↓ Research stimulator and coordinator
Male	89	89	
Female	11	11	
PROFESSIONAL PREPARATION			
Education	42	44	
Psychology	35	40	
Sociology	8	9	
Other	15	7	
HIGHEST DEGREE			
Ph. D.	52	66	
Ed. D.	30	24	
Master's	15	8	
Bachelor's	3	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	29	28	
Non-R A	71	72	
MEAN TIME SPENT IN RESEARCH	25	34	
	Median		
AGE	45	46	

Individual researchers in schools and departments of education were more likely than expected to hold the Ed. D. degree, to be trained in education, and to be spending less than 20 percent of their time in research, and less likely to have been research assistants.

The only marked differences for individual researchers in departments of psychology were those which were predictable--a greater evidence of persons trained in psychology and fewer holders of Ed. D. degrees. Also, fewer persons than expected spent two thirds or more of their time on research.

Among individual researchers in other behavioral and social science departments there were fewer Ed. D. holders and more persons trained in the relevant discipline (sociology in this case) than expected.

Individual researchers in other discipline and cognate departments were more likely to be female than was typical across the sample. There was also a slight tendency for occupants of this position to have held a previous research assistantship.

EXEMPLAR NO. 13. EDUCATION DEPARTMENT INDIVIDUAL RESEARCHERS (N=596)

Characteristics	Percent Total sample	Percent Education department individual researchers	Representation of typical career pattern
SEX			Public school teacher
Male	91	89	
Female	9	11	↓
PROFESSIONAL PREPARATION			Academic instructor
Education	69	44	
Psychology	26	40	
Sociology	1	9	↓
Other	4	7	
HIGHEST DEGREE			Individual researcher in departments of education*
Ph. D.	59	66	
Ed. D.	38	24	
Master's	3	8	
Bachelor's	--	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	26	28	
Non-R A	74	72	
MEAN TIME SPENT IN RESEARCH	27	34	
	Median		
AGE	46	46	

*Occupants of this position almost universally shared concurrent research and teaching functions.

EXEMPLAR NO. 14. PSYCHOLOGY DEPARTMENT INDIVIDUAL RESEARCHERS (N=274)

Characteristics	Percent		Representation of typical career pattern
	Total sample	Psychology department individual researchers	
SEX			Practicing psych., counslr., or clinicn. ↘ Acad. instr. ↙ Individual researchers in departments of psychology*
Male	94	89	
Female	6	11	
PROFESSIONAL PREPARATION			
Education	5	44	
Psychology	94	40	
Sociology	--	9	
Other	1	7	
HIGHEST DEGREE			
Ph. D.	87	66	
Ed. D.	10	24	
Master's	3	8	
Bachelor's	--	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	30	28	
Non-R A	70	72	
MEAN TIME SPENT IN RESEARCH	30	34	
	Median		
AGE	44	46	

*Occupants of this position generally shared both teaching and research functions concurrently.

EXEMPLAR NO. 15. OTHER BEHAVIORAL AND SOCIAL SCIENCE DEPARTMENT INDIVIDUAL RESEARCHERS (N=183)

Characteristics	Percent		Representation of typical career pattern
	Total sample	Other behavioral and soc. sci. dep't. indiv. researchers	
SEX			Academic instructor ↓ Individual researcher in other behavioral and social sciences departments*
Male	92	89	
Female	8	11	
PROFESSIONAL PREPARATION			
Education	8	44	
Psychology	18	40	
Sociology	53	9	
Other	21	7	
HIGHEST DEGREE			
Ph. D.	89	66	
Ed. D.	6	24	
Master's	4	8	
Bachelor's	1	1	
APPRENTICESHIP EXPERIENCE			
Research Assistant	27	28	
Non-R A	73	72	
MEAN TIME SPENT IN RESEARCH	34	34	
	Median		
AGE	45	46	

*Occupants of this position generally share concurrent research and teaching functions.

EXEMPLAR NO. 16. OTHER DISCIPLINE AND COGNATE DEPARTMENT INDIVIDUAL RESEARCHERS (N=94)

Characteristics	Percent		Representation of typical career pattern
	Total sample	Other discipline and cognate dep't. indiv. researchers	
SEX			P. S. tch'r ↓ Academ. instr. ↓ Academic instructor ↓ Individual researcher in other discipline and cognate departments*
Male	67	89	
Female	33	11	
PROFESSIONAL PREPARATION			
Education	67	44	
Psychology	22	40	
Sociology	3	9	
Other	8	7	
HIGHEST DEGREE			
Ph. D.	65	66	
Ed. D.	18	24	
Master's	9	8	
Bachelor's	--	1	
APPRENTICESHIP EXPERIENCE			
Research assistant	34	28	
Non-R A	66	72	
MEAN TIME SPENT IN RESEARCH	27	34	
	Median		
AGE	48	46	

*Occupants of this position share both teaching and research functions concurrently.

Supporting Data

Table 99 reports data which were not used directly in any interpretation reported herein. These data are included for informational purposes. Persons trained in education differ from expected values in that they tend to spend less time in research than anticipated, while the opposite is true of persons trained in sociology. The significant chi-square value is derived primarily from these discrepancies.

Tables 100 to 103 contain those data which yielded descriptive information and chi-square values which aided in the interpretation in the exemplars. Degrees of freedom, obtained χ^2, and significance levels are reported in conjunction with each table.

The total number of respondents varies from table to table because of (a) minor fluctuations in number of responses to different items, and (b) analyses of different portions of the total sample. In addition to the baseline sample of 1,755, one sub-sample of 1,147 (individual research personnel) was used in several analyses, and another of 2,649 (1,755 baseline + 894 "minimal-research personnel") appears in several analyses.

TABLE 99. PERCENT OF TIME SPENT IN RESEARCH BY PERSONS TRAINED IN VARIOUS DISCIPLINES: CHI-SQUARE TEST OF SIGNIFICANCE

Percent of time spent in research	Education		Psychology		Sociology		Other	
	No.	%	No.	%	No.	%	No.	%
20 - 39	326	47	270	39	52	8	38	6
40 - 65	155	41	163	43	35	10	23	6
66 - 100	21	28	29	38	20	26	6	8

$\chi^2 = 34.88$

df = 6

$p < .001$

TABLE 100. DISTRIBUTION OF SAMPLE BY SEX: CHI-SQUARE TEST OF SIGNIFICANCE ($\chi^2=124.01$, df=15, $p<.001$)

Category	Male		Female	
	Number	Percent	Number	Percent
RESEARCH DIRECTORS				
Public schools	72	85	12	15
State education agencies	23	100	0	0
Professional associations	32	89	4	11
Private research agencies	38	86	6	13
University and college institutional research units	28	90	3	10
University and college research programs	89	96	4	4
University and college research projects	67	93	5	7
University and college bureaus of educational research	38	100	0	0
RESEARCH STAFF				
Public schools	22	76	7	24
Private research agencies	54	79	14	21
University and college research programs	39	63	23	37
STIMULATOR AND COORDINATOR	24	89	3	11
INDIVIDUAL RESEARCH PERSONNEL--UNIVERSITIES AND COLLEGES				
Departments, schools, and colleges of education	540	91	54	9
Departments and schools of psychology	257	94	17	6
Other behavioral and social science departments	169	92	14	8
Other discipline and academic departments	63	67	31	33
TOTAL	1,555	89	197	11

TABLE 101. DISTRIBUTION OF SAMPLE (EXCLUDING INDIVIDUAL RESEARCH PERSONNEL) BY DISCIPLINE: CHI-SQUARE TEST OF SIGNIFICANCE (χ^2=194.45, df=33, $p < .001$)

Category	Education		Psychology		Sociology		Other	
	No.	%	No.	%	No.	%	No.	%
RESEARCH DIRECTORS								
Public schools	48	57	17	20	0	--	19	23
State education agencies	18	78	3	13	2	9	0	--
Professional associations	23	68	0	--	0	--	11	32
Private research agencies	7	15	35	79	0	--	2	4
University and college institutional research units	14	45	13	42	1	3	3	10
University and college research programs	36	37	40	43	16	18	1	2
University and college projects	20	28	33	46	11	15	8	11
University and college bureaus of educational research	27	71	11	28	0	--	0	--
RESEARCH STAFF								
Public schools	19	65	7	34	1	4	2	7
Private research agencies	23	34	40	59	4	6	1	1
University and college research programs	18	29	32	52	9	15	3	4
STIMULATOR AND COORDINATOR	11	42	9	35	2	8	4	15
TOTAL	264	44	240	40	46	7	54	9

TABLE 102. DISTRIBUTION OF INDIVIDUAL RESEARCH PERSONNEL BY DISCIPLINE: CHI-SQUARE TEST OF SIGNIFICANCE ($\chi^2 = 1021.46$, df = 9, $p < .001$)

Individual research personnel-universities and colleges	Education		Psychology		Sociology		Other	
	No.	%	No.	%	No.	%	No.	%
Departments, schools, and colleges of education	411	69	156	26	8	1	21	4
Departments and schools of psychology	14	5	253	94	0	--	1	1
Other behavioral and social science departments	15	8	33	18	96	53	37	21
Other discipline and cognate departments	62	67	20	22	3	3	8	8
TOTAL	502	44	462	41	107	9	67	6

TABLE 103. DISTRIBUTION OF CATEGORIES BY PERCENT OF TIME SPENT IN RESEARCH: CHI-SQUARE TEST OF SIGNIFICANCE ($\chi^2 = 761.01$, df = 45, $p < .001$)

Category	0-19%		20-39%		40-65%		66-100%		Average %
	No.	%	No.	%	No.	%	No.	%	
RESEARCH DIRECTORS									
Public schools	8	9	29	31	30	--	25	27	50
State education agencies	3	11	9	35	6	23	8	31	49
Professional associations	3	7	10	26	12	31	14	36	55
Private research agencies	21	32	16	25	15	23	13	20	39
University and college institutional research units	9	23	6	15	15	37	10	25	47
University and college research programs	6	6	41	42	38	38	14	14	45
University and college research projects	0	--	20	28	21	29	31	43	36
University and college bureaus of educational research	4	10	18	43	17	40	3	7	41
RESEARCH STAFF									
Public schools	10	26	4	10	10	26	15	38	51
Private research agencies	30	31	10	10	16	16	42	43	50
University and college research programs	5	7	6	9	20	30	36	54	64
STIMULATOR AND COORDINATOR	32	54	15	26	9	15	3	5	25

TABLE 103 (continued)

Category	0-19%		20-39%		40-65%		66-100%		Average %
	No.	%	No.	%	No.	%	No.	%	
INDIVIDUAL RESEARCH PERSONNEL--UNIVERSITIES AND COLLEGES									
Departments, schools, and colleges of education	440	43	383	37	180	17	31	3	27
Departments and schools of psychology	155	36	14	38	99	23	14	3	30
Other behavioral and social science departments	92	33	88	32	68	25	27	16	34
Other discipline and cognate departments	76	45	56	33	33	19	5	3	27
TOTAL	894	34	872	33	589	22	291	11	34

Conclusions

This analysis leaves many questions unanswered; indeed, its main contribution has likely been to raise questions which might be further investigated. Inferences drawn from these data must take into account several limitations inherent in this analysis.

Limitations of the analysis. The nature of the autobiographical reports introduced three limitations which are listed below.

1. The generic position types used as initial and intermediate components in the career pattern analysis are of necessity very broad. For example, the title "Academic Instructor" encompasses the gamut from teaching assistant to full professor. Operationally it was impossible to differentiate more accurately among higher education teaching personnel. Consider the difficulty of attempting to classify a Master's degree holder who simply listed "teaching" as his position in a specific department of an institution of higher education. With many such cases, the types were left broad of necessity. This makes it difficult to trace sub-career patterns which develop within these broad institutional categories. For example, one would predict, on logical grounds, that career patterns within the "Academic Instructor" category would follow the sequence of teaching assistant, instructor, assistant professor, associate professor, and full professor. These

data are not adequate to provide a reliable empirical check of any such assertion, however. Therefore, personal judgments about such considerations have doubtlessly influenced to some extent the inferences and implications drawn from the data.

2. Similarly, in many instances it was not possible to determine whether the position(s) listed were full- or part-time positions. The nature of the responses precluded differentiation, for example, between half-time doctoral students identified as "Research Associates" and full-time non-student researchers identified by the same nominal title.

3. There is no way to ascertain the respondent's frame-of-reference when answering the question which asked for the percent of time spent in research, as opposed to that spent in other activities, such as teaching and administration. Certainly, many diverse definitions of research were employed by the respondents as they answered this item. Whether or not such differences would balance across categories is an open question. If some differential between categories operated (e.g., research project directors defining research more restrictively than public school research directors), then results based on differential time commitments could be questioned. A further complication of this matter exists in the case of research administrators. How would a director of a large research

project, with several assistants, decide how much of his time spent working with them is research and how much is administration? The questionnaire offered no solution to such a dilemma, and the extant data suffers from this same limitation.

Turning to the positive, the types of quantitative analyses which were conducted are seemingly quite adequate, notwithstanding the limitations, for the types of gross inferences which are drawn from these data. The remainder of this section will be devoted to a discussion of such inferences and their implications for practice.

Similarities among career patterns. The analysis reveals that several positions are reached by way of identical, or very similar, career patterns. For example, the sequence "public school teacher, public school administrator, ________________" is typical not only of public school research directors but of research directors in state education agencies and professional education associations as well. If only one component, that of academic administrator, were added to this basic sequence, one would have a predominant career pattern for directors of educational research bureaus. Similarly, directors of higher education institutional research units share a common career pattern with directors of research institutes, centers, laboratories, etc., in higher education. Another common career pattern is shared by research stimulator-coordinators and individual researchers in departments and colleges of education.

Such similarities as the above are only suggestive of ways in which the career pattern exemplars might be viewed. Another approach would be to take specific position types and see to what specific research positions they are most likely to lead. It would appear, for example, that public school teachers are viable prospects for many terminal research positions, whereas research assistants tend to gravitate into only two or three of the positions. Figure 3 summarizes this view of the exemplars. It lists immediate, intermediate, and long-range targets representing the point of origin of the career sequence.

Targets for recruitment. It is obvious from Figure 3 that two position types stand out as prime, long-range recruitment pools--public school teachers and academic instructors. These two stand out even more when percentages of all persons in the sample who began their careers in one of these positions is compared with those of persons in other initial positions. Table 104 lists the percent of the baseline sample of 1,755 who occupied each of the generic position types as their initial professional position.

Category	Recruitment target group		
RESEARCH DIRECTORS	IMMEDIATE	INTERMEDIATE	LONG-RANGE
Public schools	Public school administrator		Public school teacher
State education agencies	Public school administrator		Public school teacher
Professional Associations	Public school administrator		Public school teacher
Private research agencies	Academic instructor	Research assistant	Public school teacher, academic administrator
University and college institutional research units	Academic administrator	Academic instructor	Public school teacher, academic administrator
University and college research programs	Academic administrator	Academic instructor	Public school teacher, academic instructor
University and college research projects	Academic instructor		Research assistant

FIGURE 3. IMMEDIATE, INTERMEDIATE, AND LONG-RANGE RECRUITMENT TARGET GROUPS FOR SELECTED EDUCATIONAL RESEARCH POSITIONS

FIGURE 3 (continued)

Category	Recruitment target group		
RESEARCH DIRECTORS	IMMEDIATE	INTERMEDIATE	LONG-RANGE
University and college bureaus of educational research	Academic instructor	Public school administrator	Public school teacher
RESEARCH STAFF			
Public schools	Public school teacher		Public school teacher
Private research agencies	Academic instructor outside agencies		Academic instructor outside agencies
University and college research programs	Academic instructor research assistant		Academic instructor, research assistant
STIMULATOR AND COORDINATOR	Academic instructor		Public school teacher
INDIVIDUAL RESEARCH PERSONNEL--UNIVERSITIES AND COLLEGES			
Departments, schools and colleges of education	Academic instructor		Public school teacher

FIGURE 3 (continued)

Category	Recruitment target group		
INDIVIDUAL RESEARCH PERSONNEL--UNIVERSITIES AND COLLEGES	IMMEDIATE	INTERMEDIATE	LONG-RANGE
Departments and schools of psychology	Academic instructor practicing psychologist		Academic instructor, practicing psychologist
Other behavioral and social science departments	Academic instructor		Academic instructor
Other discipline and academic departments	Academic instructor		Academic instructor, public school teacher

TABLE 104. DISTRIBUTION OF INITIAL CAREER POSITIONS OF SAMPLE, BY GENERIC POSITION TYPES[9]

Position	Percent
Public school teacher	30
Public school administrator	4
Research assistant	11
Academic instructor	29
Academic administrator	3
Practicing psychologist	7
Other agency positions	5

Academic instructors, as a manpower pool for recruiting R, D, and D personnel, have not been ignored by recruiters in the past. Here, however, the recruiting has been primarily for entrance into positions, not entrance into training programs. On the basis of these data, it would appear that recruitment of academic instructors (at least pre-doctoral persons among the teaching assistant-instructor ranks) might prove fruitful for training programs in R, D, and D. In view of the marked tendency of research persons in this sample to begin their careers as academic instructors, thought should be given to the development of systematic, long range plans for recruitment among such persons.

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[9] The percentages do not sum to 100 percent because approximately 11 percent of the sample began their careers in initial positions which were scattered, generally less than one percent to a category, and which are not included in the table.

Public school teachers are not only the largest long range recruitment pool identified by this analysis, but they also represent by far the largest extant manpower pool in education. All things considered, teachers are probably the most viable existing pool (excepting undergraduate students) for long range recruiting of R, D, and D personnel. Indeed, the public school teaching group is the only single "post-bachelor's degree" group large enough to serve as a continuing source for such recruitment. In addition, there is little indication that this source has been tapped other than randomly. If systematic recruitment were to occur among public school teachers, it is likely that their flow into formal and informal R, D, and D training efforts would increase dramatically.

As an editorial aside, some persons argue that, given the great shortage of classroom teachers, it would be a grave mistake to further deplete their ranks by attracting them into R, D, and D positions. Such an argument is not very compelling, however, when viewed in the cold light of logic. It is likely that a majority of the teachers who would be attracted by recruitment for R, D, and D positions would eventually leave the classroom anyway. Many teachers view classroom teaching as an intermediate step toward a career goal in college teaching or public school administration. In fact, many of these persons may never have entered the classroom in the first place had it not been for the requirement of many graduate schools of education that X years of teaching experience must precede entrance into the program. The classroom becomes a necessary stepping stone, and little more than that, for many educators who are career-bound toward other types of positions. In this context, it would seem that systematic R, D, and D recruitment among public school teachers is unlikely to increase the teacher shortage significantly. Rather than resulting in a loss of classroom teachers, such recruitment will simply place R, D, and D programs in the position of competing for the teachers who are already prone to migrate to college teaching and school administration. Given the urgency of their manpower needs, the R, D, and D community should brook no delay in entering into such competition. Means must be found for early identification and recruitment of talent from the pool of public school teachers.

Viable as teachers are as a recruitment pool for R, D, and D, the discussion thus far leads inescapably to the conclusion that the pool of undergraduate students is _the_ pool which must eventually be tapped. If students could be recruited and trained for R, D, and D before they have expended a great deal of time in preparing for teaching roles, and later in teaching, a considerable amount of time could be saved in getting R, D and D personnel trained and on the job. This saving of time would be possible, of course, only if the entrance requirement of professional experience could be waived for those who wish to pursue a career in educational research. Sieber recommended such action, pointing out that fewer researchers are produced when professional experience is required as a condition of enrollment in the graduate program than when programs have no requirement of professional experience.[10] Buswell, *et al.*, were still more explicit in arguing that time spent in the classroom detracts from future career development in research. They found that the "number of years of teaching experience prior to the doctor's degree is negatively related to research production in the 10 years following the degree."[11]

With the elimination of the professional experience requirement, serious recruitment efforts among undergraduates could begin. As Sieber has recommended:

> Graduate schools of education should institute means of identifying and attracting better undergraduate students, preferably from the arts and sciences, even if this entails intensive recruitment campaigns across the nation.[12]

Other recruitment pools (e.g., public school administrators) might be tapped if a small number of recruits were needed for specific positions to which they showed a predisposition to gravitate. But it is difficult to imagine that such short range recruiting from immediate target groups will provide the type of help needed most. To begin with, such pools are relatively small when compared to the public school and college teacher pools mentioned earlier, as well as to the uncharted undergraduate student pool. It also seems that, with the exception of research assistants, the relatively greater investment spent in reaching administrative and clinical positions will operate to reduce the likelihood of subsequent career redirection.

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[10] Sieber, *op. cit.*

[11] Buswell, *et al.*, *op. cit.*, p. 15.

[12] Sieber, *op. cit.*, p. 350.

In summary, the career pattern analyses would suggest that attention should be given to continued recruitment among academic instructors and research assistants, while efforts to recruit public school teachers into R, D, and D ranks should be increased greatly. Logical extension of this analysis seems to support the proposition that undergraduate students represent the ultimate recruitment pool for research, development, and diffusion personnel.

Implications. It was mentioned earlier that separate career pattern analyses were conducted for the years preceding and following academic year 1956-1957. The purpose of this differentiation was to analyze the influence of the Cooperative Research Program (CRP) of 1954 (operational in academic year 1956-1957) on career pattern development. The CRP influenced career development in three ways. First, it increased the mobility of persons in many different positions in education and enhanced their attempts to move toward research and research-related activities. Secondly, the length of time was reduced between the beginning of a professional career and the first appearance in the research category occupied at the time of analysis. Before academic 1956-1957, an average of 14 years were spent in reaching the current position category. After the CRP became operational, this period was compressed to slightly over eight years. This would suggest not only new outlets and more diversified routes for young researchers but also the sharp increases in number of R, D, and D positions in the post-1956 era. Thirdly, the proportion of teachers entering research increased sharply after 1956.

This status analysis used data which preceded the ESEA of 1965. In view of the effects which the modestly affluent CRP had upon the vocational opportunity and positional mobility of educational research and research-related personnel, it is almost staggering to contemplate the ramifications of the ESEA upon career patterns of educational researchers. Its impact will be vastly greater in the kind and amount of opportunity. The marked post-CRP surge of teachers into R, D, and D positions is a case in point. This trend has wide-reaching implications for research training. Perhaps the most important of these is that which suggests a growing need for informal training programs and "do-it-yourself" packaged training materials. But this need multiplies exponentially when the impact of the ESEA is realized. The number of unfilled positions, coupled with the need to fill them quickly, mandates against teachers taking time to go to graduate school before occupying the positions. It is inevitable that formal programs will be cut short, and teachers will continue to move directly into R, D, and D activities. In such a context, on-the-job training becomes a necessity, and development of materials for such training becomes one of the highest priorities of the research community. This activity should not be allowed to detract from the improvement of formal preparation programs, however. If more effective undergraduate recruitment is coupled with improved formal preparation, sufficient quality and quantity of personnel should be produced to cope with the immediate manpower crisis. Theoretically, a Utopian balance of supply and demand could eventually occur, and the necessity to retrain teachers with packaged, on-the-job materials would be greatly reduced or eliminated.

In the meantime, the importance of the public school teacher group as a recruitment source will have other ramifications. It is probable, for example, that R, D, and D units in public schools might be enhanced and built up because of their priority access to talent in their system. Because of their advantage in accessibility to recruits, R, D, and D money might well begin to go directly to school research units. Development of these units might include the development of training components which would not only serve in-house training needs but also have heuristic value for planners of formal preparation programs.

Finally, the effect of the manpower shortages predicted by Clark and Hopkins should be mentioned. The projected lag between supply and demand in the educational research community leads one to expect that career patterns, as such, will become increasingly confused as pressures result in the impressment into various R, D, and D positions of persons with very divergent qualifications. The unprecedented manpower demands which the ESEA is creating might well lead, in some quarters, to filling positions with almost whomever is available. As such trands develop, the only career "pattern" might well be the lack of any pattern at all. It is possible that the particular career pattern exemplars presented herein might be reduced by the ESEA to items of mere historic interest. As educational researchers migrate back and forth from one type of career pattern to another, they will create eddies into main currents to establish still newer career patterns. But career patterns will emerge, and when they do, career pattern analysis can be utilized to identify the extant manpower pools which are filtering into the educational research mainstream.

The Research Assistantship and Research Involvement

It is generally assumed that participation in research is one of the most valuable experiences that prospective researchers can have. Many educational research training programs attempt to provide such experience through a research apprenticeship experience of some type. Where formal apprenticeships are not provided, student researchers are usually advised to apprentice themselves to some research project or program in order to gain practical research experience. It is argued that such experience not only serves as a valuable instructional supplement to research courses, but also serves to identify the student to research faculty and provides him with a context for valuable interaction with seasoned researchers. In short, it is widely accepted that a research apprenticeship is a crucial component of any educational research training program, and that such an apprenticeship goes far to help establish the neophyte researcher in his chosen career. The familiar "research assistantship" is the vehicle through which such apprenticeship experience is typically gained.

The value of the research assistantship is also supported by empirical findings from studies dealing with the training of educational researchers. Buswell, et al., found that graduate student research experience was positively related to research productivity in the 10 years following the awarding of the doctor's degree.[13] Sieber, basing his proposals on results from his study, has recommended that students be urged to involve themselves in research apprenticeship, and that training for research be shifted from the classroom to the workshop.[14] In short, the data yielded by such studies has seemed to conform well with the logical premises researchers hold for the value of research assistantship experience.

This seemingly untroubled state of affairs is deceiving, however. Two compelling reasons exist for analyzing the research assistantship in greater depth. The first of these is the wide discrepancy between the stated acceptance of apprenticeship as a crucial training component and the failure to provide training opportunities to a great many prospective researchers. Sieber has noted that intensive research preparation through project internships is quite rare, with approximately five percent of the graduate students in schools of education having such opportunities.[15] Buswell and his colleagues found there has been virtually no increase from 1954 to 1964 in the percent of doctoral students holding research assistantships, _despite_ the inception of the CRP during this decade.[16] In short, if the value of the research assistantship is accepted, it is obvious that opportunities for such experience exist for far too few.

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[13] Buswell, _et al._, _op. cit._

[14] Sieber, _op. cit._

[15] Sieber, _op. cit._, p. 258.

[16] Buswell, _et al._, _op. cit._, p. 53.

A second question remains. Are the relatively few research assistantships now available being utilized to provide the type of experience which is most valuable to prospective researchers? Are research assistants provided with the type of experience which will, in fact, aid in their career development as educational researchers? No completely unequivocal answer can be given at present, but there seem to be several disquieting indications that research assistantships are falling far short of their potential as a training experience for would-be researchers. Of course, provision for training is not the only purpose for research assistantships--another function is that of providing support personnel for research projects and ongoing programs. However, the latter purpose for apprenticeships in educational research may be overemphasized at the expense of the former.

Sieber, for example, while steadily maintaining that research apprenticeship experience is relatively more valuable in research training than course work, is quick to point out deficiencies in existing apprenticeship programs. He notes that research apprenticeships do not eventuate in research careers when no institutional policies exist to insure that the apprenticeship is a meaningful training experience.[17] This finding lends itself to the interpretation that utilization of research assistants is often insensitive to the need to have the assistantship serve a training function. Sieber recommends that each USOE-supported research project include additional funds to train a research assistant "*beyond the minimal needs of the project for routine assistance* . . . in order partly to . . . reduce the exploitation of students as research assistants."[18] This recommendation is an obvious recognition that research apprenticeship is falling short of its training potential.

Whatever the reason, it would seem that a majority of research assistants are not sufficiently motivated to pursue careers in educational research. Sieber found that "*only 26 percent of the doctoral recipients who had worked in bureaus in the preceding three years entered positions where research was a primary responsibility*."[19]

In view of the above, it would seem reasonable to suspect a sizeable theory-practice gap in the administration of research assistantships. It is certainly reasonable to assume that training researchers through participation in research is an invaluable training method. But it may not be reasonable at all to assume that the typical research assistantship encourages genuine participation in research. Indeed, the re-analysis of normative data which is reported herein brings into question the utility of the research assistantship (as presently administered) as a vehicle for career development in educational research.

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[17] Sieber, *op. cit.*, p. 302-303.

[18] *Ibid.*, p. 349.

[19] *Ibid.*, p. 315.

Analysis and Results

A total of 2,649 questionnaires collected for the *National Register of Educational Researchers* were analyzed to determine whether or not the respondent had ever served a research assistantship and what percent of time he was spending currently on research. Research apprenticeship experience was dichotomized as research assistant-non research assistant (RA-NRA), while percent of time was arbitrarily divided into four classes (0-19 percent, 20-39 percent, 40-65 percent, 66-100 percent). The 2,649 respondents, sorted into position categories, were distributed on these two characteristics as shown in Table 105.

Four analyses of the data were conducted. The first of these tested the relationship of research assistantship experience to later involvement in educational research, across the total sample.[20] It was found that *research assistantship experience is inversely related to*

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[20] "Involvement" is here defined as the percent of total professional time which a person spends on research as opposed to teaching, administration, etc.

TABLE 105. DISTRIBUTION OF SAMPLE BY POSITION TYPE, RESEARCH ASSISTANTSHIP EXPERIENCE, AND PERCENT TIME SPENT IN RESEARCH

Category	0-19%		20-39%		40-65%		66-100%		Total	
	RA	NRA	RA	NRA	RA	NRA	RA	NRA	RA	NRA
RESEARCH DIRECTORS										
Public schools	4	4	10	19	7	23	5	20	26	66
State education agencies	2	1	5	4	1	5	1	7	9	17
Professional associations	2	1	4	6	2	10	1	13	9	30
Private research agencies	7	14	9	7	6	9	3	10	25	40
University and college institutional research units	3	6	3	6	0	15	2	8	8	35
University and college research programs	2	4	15	26	5	33	2	12	24	75
University and college research projects	0	0	10	10	10	11	16	15	36	36
University and college bureaus of educational research	2	2	10	8	2	15	1	2	15	27
RESEARCH STAFF										
Public schools	3	7	2	2	2	8	3	12	10	29
Private research agencies	7	23	2	8	2	14	10	32	21	77
University and college research programs	3	2	4	2	9	11	9	27	25	42
STIMULATOR AND COORDINATOR	8	24	5	10	3	6	1	2	17	42

TABLE 105 (continued)

Category	0-19%		20-39%		40-65%		66-100%		Total	
	RA	NRA	RA	NRA	RA	NRA	RA	NRA	RA	NRA
INDIVIDUAL RESEARCH PERSONNEL--UNIVERSITIES AND COLLEGES										
Departments, schools, and colleges of education	144	296	95	288	22	158	4	27	265	769
Departments and schools of psychology	62	92	51	110	11	88	3	12	127	302
Other behavioral and social science departments	27	65	21	67	13	55	13	13	74	200
Other discipline and academic departments	39	37	15	41	4	29	0	5	58	112
TOTAL RA-NRA	316	578	261	614	99	490	74	217	750	1,899
									28%	72%
TOTAL FOR EACH CATEGORY	894		875		589		291			2,649
	34%		33%		22%		11%			

later involvement in research activities (chi-square=61.59, df=3, $p < .001$). In other words, persons who have served research apprenticeships spend less time on research in their later professional positions than do persons who have not had such experience.

Two sub-analyses were conducted to assess the above relationship (1) within the individual research personnel categories, and (2) across the remaining categories in the sample. Both were highly significant, again in an inverse relationship (chi-square=65.03, df=3, $p < .001$ for individual research personnel, chi-square=20.29, df=3, $p < .001$ for the remaining categories).

A final analysis was used to test the relationship between position categories and research assistantship experience. There were significant differences among the categories in the proportion of occupants who had prior research assistantships (chi-square=38.10, df=15, $p < .001$). The discrepancies which contributed to the significance of the chi-square were greatest in the university research project director category. Here, there were many more RAs and far fewer NRAs than expected. The reverse trend was true in the individual research personnel-school of education category, which exhibited significantly fewer RAs and more NRAs than expected. Significantly more RAs were also found in the categories of individual research personnel--other disciplines, research staff in university research programs, and research directors in private research agencies. Significantly more NRAs than expected were found among directors of ongoing university research programs. Fewer RAs than expected were found among directors of university institutional research units and research staff in private research agencies. All of these trends are moderate, however, when compared to the magnitude of the relationship in the university research project director category.

Conclusions

Certainly the most striking result above is that which shows the overall negative relationship between research assistantship experience and later research involvement. Such anomalous data suggest that research assistantships, as presently administered, are not beneficial to future career development in educational research--the apprenticeship is typically employed in such a manner as to rob it of much of its potential. This assertion, however, is subject to certain inherent limitations of the analysis which must be considered.

Limitations of the analysis.

At least three factors limit the interpretability of the findings. First, these data do not reflect any changes in the pattern of research assistant utilization which might have occurred since 1964, when the data were collected. For example, nothing can be said in the current analysis about the impact of the training programs which were intitiated in 1965 under the Research Training Branch of the USOE. Presumably, these programs will have marked impact on the quality of research assistant experiences.[21] Of course the converse is also possible--the expansion of programs might simply result in more of the same.

Secondly, no differentiation was made in this analysis between research assistantships in the various disciplines. The inverse relationships between involvement in research and RA experience for individual research personnel can be extrapolated to this question, and to the extent that persons in various discipline settings were trained in those settings, the extrapolation may not be unreasonable. But neither is it completely satisfactory. It is conceivable that research assistantships vary widely among disciplines, and this should be explored more thoroughly.

A third limitation of this analysis is that it provides no clue as to why the inverse relationship exists. Present attempts at explanation can be based only on logical grounds, and in the absence of empirical support the explanations are tentative at best.

Alternative explanations. The finding that persons with research assistantship experience spend less time on research than do persons without such experience is subject to alternative, rival interpretations as to causal factors. Three plausible explanations for this finding appear below.

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[21] A recent study of these training programs is Sieber, Sam D., Analysis of U.S.O.E. Research Training Programs, 1966-67, Cooperative Research Project no. 7-8315, Bureau of Applied Social Research, Columbia University, New York, January, 1968, 102 pp.

1. The research assistantship, as currently employed, fails to provide sufficient motivation for students to maintain interest in, and commitment to, a career in educational research. Such an assertion appears reasonable when it is noted that the activities of a great many research assistantships are comprised almost completely of routine clerical or rote statistical work. Many research assistants find themselves "locked into" the most mundane and trivial aspects of the research process. Prolonged exposure to tedious hours spent rummaging in card catalogs, collating and hand-scoring tests, etc., may be sufficient to discourage all but the hardiest spirits from continuing involvement in educational research.

2. Persons who have served a research apprenticeship are better acquainted with the research process, knowing both what it is and what it is not. Thus, in reporting percent of time spent in research activities, such persons are less likely to report non-research activities under the heading of research. This would, of course, reduce these percentages in relation to persons who have not served apprenticeships and who have not

been constrained by equally rigorous definitions of research.

3. The percent of time spent in research is not a good criterion of research productivity. For example, persons who have served research assistantships (RAs) might be more aware of the possibilities for utilizing support personnel in research than persons who have never been research assistants (NRA's). If this were true, it would be possible to find that RAs are able to make more effective use of their current counterparts, thus enabling them to produce as much or more research in a limited time than NRA's might produce when spending a higher percent of time on research, i.e., productivity and percent time spent are not necessarily correlates in research.

At present, no evidence can be provided as to which of the above, or other, explanations is more accurate. It is probable that no single explanation will be sufficient--the negative relationship might well be dependent on some combination among the alternate explanations. But the crucial point which must be made is that no knowledge is available at present to discount any of the above explanations. If either the second or third should prove to be the most satisfactory explanation, then the data would have proved interesting, but not of overwhelming import. But if the first explanation should prove correct, it would have major implications for changes needed in utilization of research apprenticeships.

Exploration of the impact of research apprenticeship experience on future career development of educational researchers appears to be an area of useful further study. Given the present manpower crisis in this area, every attempt should be made to recruit and maintain both qualitative and quantitative excellence in research training programs. On the basis of both logical grounds and the results of previous studies, the research assistantship *could* be the most viable training experience for prospective researchers. On the basis of present data, it would appear possible, if not probable, that the potential of the research assistantship is being sharply curtailed by its misuse as a training experience. Within this context, a study is needed which will investigate in depth the nature of the research assistantship and its impact on future career development of educational researchers.[22]

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[22] A study on this topic is currently being conducted by the author and Arliss L. Roaden at The Ohio State University. Although not yet completed, results from a preliminary phase suggest that (a) genuine assistantships (in which the students engage in research as a primary activity) are positively related to subsequent research involvement and productivity; (b) ersatz assistantships (in which students do *not* engage in research as a primary activity) are *not* related to subsequent research involvement or productivity; and (c) *ersatz* and genuine assistantships interact to create an inverse relationship between the combined experiences and subsequent research involvement.

This research is done pursuant to a grant from Phi Delta Kappa International. The final report of this study will be available in late 1969 from Phi Delta Kappa, Bloomington, Indiana.

APPENDIX G

AN ANALYSIS OF RESEARCH TRAINING PROGRAMS[1]

In August of 1967, a letter was sent to all directors of Title IV ESEA research training programs and to 340 professors of educational research. In addition to a request for general program descriptions, the following specific questions were posed: (1) What program content is considered unique? (2) What curriculum materials are used that are not normally available through commercial publishers? (3) What is the nature of apprenticeship experiences required of trainees? and (4) To what extent are persons being prepared to fill newly emerging R, D, and D roles?

Others have described some aspects of research training programs. These descriptions generally have dealt only with methodological content. For example, Sieber noted that doctoral producing institutions offered an average of 915 courses in research which were scattered throughout a large number of departments, with concentrations in established divisions for training researchers in only 27 percent of the schools. "Basic research methods and design," a course most frequently offered by the schools, was offered by 96 percent of the schools, and

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[1] This appendix was prepared by Arliss L. Roaden, Professor of Education at The Ohio State University.

4.6 such courses were offered per school; next, "statistics" was offered by 85 percent of the schools, and 3.0 courses per school; "testing and measurement" was offered by 71 percent of the schools, with 2.0 courses per school; courses reflecting "needed research" were offered in 22 percent of the schools, with 2.2 courses per school; "school surveys" (which contribute to research) was offered by 16 percent of the schools, with 1.5 courses per school; and all other research courses were offered by only 14 percent of the schools, with 2.7 courses per school.[2]

Krathwohl's survey of doctoral producing universities revealed that 91 percent of the institutions offered an introductory course in research; a greater percentage offered statistics; 46 percent offered an experimental design course; and courses in measurement and evaluation were frequent. However, the full sequence of courses--research methods, statistics, design, and measurement--as a requirement in doctoral programs was rare.[3]

Sieber, in his recent Analysis of USOE Research Training Programs, examined the substantive specialization of the trainees. At least two thirds of the Title IV trainees attained their highest degrees in some aspect of professional education.[4] The tendency for trainees to be located in university departments of education was greater than that of researchers-at-large identified by Bargar and his colleagues.[5] Sieber viewed with concern the underrepresentation of specialization in the non-educationist disciplines.

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[2] Sieber, Sam D., The Organization of Educational Research in the United States, Cooperative Research Project no. 1974, Bureau of Applied Social Research, Columbia University, New York, 1966, pp. 292-293.

[3] Krathwohl, David R., "Current Formal Patterns of Educating Empirically Oriented Researchers and Methodologists," in The Training and Nuturing of Educational Researchers, pp. 73-94, edited by Egon Guba and Stanley Elam, Phi Delta Kappa, Bloomington, Indiana, 1965.

In the study reported here, program information adequate for analysis was received from 47 institutions. Returns were far more prevalent from directors of federally-funded programs (usually Title IV) than from other research professors. No doubt these persons felt a greater obligation to respond to the query, and it is also reasonable to assume that regular university financed programs were not as well defined and consisted of a looser assortment of courses and apprenticeships; thus, the effort to describe such programs was more trouble for the respondent. Most responses from directors of federally-financed programs consisted of copies of proposals or progress reports; however, many programs were described by letter and/or printed publicity materials.

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[4] Sieber, Sam D., Analysis of USOE Research Training Programs, 1966-1967, CRP no. 7-8315, Bureau of Applied Social Research, Columbia University, New York, January, 1968, p. 67.

[5] Bargar, Robert; Guba, Egon, and Okorodudu, Corahann; Development of a National Register of Educational Researchers, CRP no. E-014, The Ohio State University, Columbus, 1965, p. 139.

The programs were sorted by institution and by level of study (post-doctoral, doctoral, terminal masters, undergraduate, and short-term institutes); and the programs were studied to ascertain substantive specialization, research methodology, course content, and the nature of apprenticeship experiences.

Table 106 indicates the universities and other institutions that described their research training programs and the level of programs described. Obviously, some of the institutions had programs that were not described.

These institutions, though not a comprehensive listing of all the research training institutions, do encompass those that produce the majority of researchers. Research producing institutions were identified by Bargar,[6] Buswell,[7] and Sieber.[8] Those listed, arrived at through different criterion measures, were collapsed by Worthen[9] and ranked. Thirteen of the institutions listed above were in Worthen's top 15 universities.

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[6] *Ibid.*

[7] Buswell, Guy T., *et al.*, *Training for Educational Research*, CRP no. 51074, Center for the Study of Higher Education, University of California, Berkeley, 1966, 150 pp.

[8] Sieber, *The Organization of Educational Research in the United States*, *op. cit.*

[9] Worthen, Blaine R., *The Impact of Research Assistantship Experience on the Subsequent Career Development of Educational Researchers*, Unpublished dissertation, The Ohio State University, Columbus, 1968.

TABLE 106. RESPONDENT INSTITUTIONS AND ACADEMIC LEVEL OF PROGRAMS REPORTED

Institution	Level of research training program				
	Post doctoral	Doctoral	Terminal master's	Under-graduate	Short-term institutes
American Institutes of Research	x				
Ball State University					x
Bucknell University			x		
University of California at Berkeley		x			
Case-Western Reserve University		x			
University of Chicago (two programs)		x			x
Colorado State University		x			
Columbia University (three programs)		xxx			
Cornell University		x			
University of Denver					xx
Eastern Kentucky University				x	
University of Georgia		x			
Harvard University		x			
Iowa State University		x			
University of Iowa		x			
Kentucky State Department of Education					x
Lehigh University		x			
Maryland State Department of Education					x

TABLE 106 (continued)

Institution	Post doctoral	Doctoral	Terminal master's	Under-graduate	Short-term institutes
	Level of research training program				
Memphis State University				x	
University of Miami			x		
Michigan State University		x			
University of Michigan		x			
University of Minnesota		x			
University of Nevada		x			
University of New Hampshire					x
New Mexico State University		x			
New York University		x			
University of North Dakota		x			
North Eastern University			x		
Northern Illinois University				x	
The Ohio State University (four programs)		x		x	xx
Pennsylvania State University		x			
University of Pennsylvania		x			
Purdue University		x			
Rockland Community College					y
San Diego State College			x	x	
University of Southern California		x			
University of Southern Mississippi		x			

TABLE 106 (continued)

Institution	Level of research training program				
	Post doctoral	Doctoral	Terminal master's	Under-graduate	Short-term institute
Stanford University	x	x			
Syracuse University		x			
University of Tennessee		x			
Texas A & M University					x
Toledo University					x
Towson State College				x	
University of Washington		x	x		
Western Kentucky University					x
University of Wisconsin		x			

Program Descriptions
by
Academic Program Level

Post-doctoral programs

Only two institutions reported post-doctoral programs. One reported that a program had been approved by USOE but that no satisfactory applicants were identified. One other reported that their program had been cancelled by USOE. Of the two institutions that described post-doctoral programs, one did not formalize the program beyond what was available for pre-doctoral students, but suggested an informal relationship with researchers in one of the laboratories. The one program described was for scientists already in educational research, to familiarize them with techniques of designing and executing a large-scale, long-range educational research project.

The post-doctorate in educational research has not been developed to any significant extent, although Title IV did provide some support for these programs. The post-doctorate holds some promise for sharpening research skills of experienced researchers and broadening the researcher's understanding of researchable problems; however, the preparation of researchers through such programs holds little promise. Accumulated data suggest that well defined career patterns are difficult to modify into productive research patterns, even with extensive training.

The generally early age when researchers begin their productive careers does not bode well for post-doctorates as mechanisms for research training. For that reason, the small number of defined post-doctoral programs is not alarming.

Doctoral programs

Doctoral programs have been the mechanisms on which society has relied for the preparation of researchers in all disciplines. The "doctor's degree" and the "extension of knowledge" have been thought of as being nearly synonymous. As Title IV funds became available, the extensive funding of doctoral programs in education was not surprising. Sieber[10] noted, however, that participants in these programs have been largely persons with experience in non-research educational careers. The effectiveness of these doctoral programs for modifying persons from professional performance roles to research roles remains to be seen.

Table 106 lists all substantive fields identified in the program descriptions. These were the programs developed within the context of a substantive field. The objective was to prepare researchers whose skill would be applied to improving and extending knowledge in those substantive fields.

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[10] Sieber, Analysis of USOE Research Training Programs, 1966-67, op. cit.

TABLE 107. SUBSTANTIVE FIELDS OF DOCTORAL RESEARCH TRAINING PROGRAMS

Substantive fields	Number of institutions offering programs in substantive fields
Adult Education	1
Agricultural Education	1
Biological Sciences	1
Child Development	1
Counseling Psychology	1
Curriculum and Instruction	4
Earth Sciences	1
Economics	1
Educational Administration	7
Educational Psychology	5
Elementary Education	1
Geography	1
Guidance and Counseling	1
Higher Education	2
History of Education	1
Home Economics Education	1
Human Development	1
Human Resources	1
Industrial Education	1
Language Behavior	1
Learning	1
Mathematics Education	3
Music Education	1
Orthopedically Handicapped	1
Personality	1
Philosophy of Education	1
Physical Sciences	1
Psychology	1
Reading	1
School Organization	1
Secondary Education	1
Social Context of Education	5
Social Science Education	1
Social Psychology	2
Sociology	1
Urban Education	1
Vocational Education	1

Twelve universities described programs in which the substantive field was the substance of research methodology. Programs for preparing persons to improve and extend what is known about educational research methodology may in the long run make a significant contribution to alleviating research manpower shortages, as well as improving the quality of educational research. The substantive fields in research methodology which constituted the substance of these research training programs are listed in Table 108.

Titles of the fields in Table 108 identify the subject matter of each program. The itemization of courses and credit hours for those programs or for programs identified in Table 107 was a fruitless endeavor. Course descriptions were inadequate in many cases, and comparability of courses across programs could not be established with any sense of accuracy. The tabulation of courses and credit hours, even if possible, seemed to be non-productive. The relationship of number of research courses to research productivity was not established by Buswell.[11] What was established by Buswell, however, was a relationship between research productivity and whether or not participants in his study held a research assistantship during doctoral studies. The value of research assistantships has been

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[11] Buswell, *et al.*, *op. cit.*

TABLE 108. SUBSTANTIVE FIELDS IN RESEARCH METHODOLOGY OF DOCTORAL RESEARCH TRAINING PROGRAMS

Field	Number of institutions offering programs in each field
Computer Science	1
Design and Data Analysis	1
Design, Measurement and Statistics	1
Educational Research (Methodology and Practica)	2
Educational Research (Foundations, Statistics, Research Design, Measurement, and Evaluation)	1
Mathematical Sciences	1
Measurement, Evaluation, and Statistical Analysis	1
Measurement and Evaluation	1
Measurement and Research	2
Statistics	1

heralded by most people who have reflected on research training. Therefore, special efforts were made in this analysis to identify the nature of whatever apprenticeship or related non-course experiences were described in each program. Most program directors called attention to the importance of these experiences.

Table 109 notes the frequency and duration of non-course components of the doctoral programs. Research experiences during the period of doctoral study were frequent in educational research training programs. However, academic credit for such experiences was not commonplace. It may be that research experiences (non-credit) and courses (credit) competed for the time of doctoral students and the creative possibilities of the assistantship were hampered by the need to fulfill academic credit requirements. If research apprentice experiences are as valuable as they are purported to be, then credits might well be given for that aspect of the program. Some have contended that paying a stipend and giving academic credit for the same assistantship experiences presents an ethical conflict for the institution. Such an argument seems to have little logic, especially in view of widespread practices of paying stipends to participants in workshop and institute courses.

TABLE 109. NON-COURSE COMPONENTS OF DOCTORAL RESEARCH TRAINING PROGRAMS

Nature of non-course component of program	Number of programs that include these experiences	Duration of experiences					
		Entirety of program	3 yrs.	2 yrs.	1 yr.	1 quarter or semester	Duration not included
Research Apprenticeship or Assistantship[a]	23	9	4	3	3	1	3
Seminar-Colloquia[b]	20	6		1	1		12
Independent Research-Dissertation	26						26
Research Experience[c] (not defined)	13	2	4	1		1	5

[a] In 4 programs academic credit is given for apprenticeship-assistantship experience.

[b] In 4 programs academic credit is given for seminar-colloquia components of programs.

[c] In 3 programs academic credit is given for non-defined research experience.

Another important consideration regarding the research experience components of training programs is the locus of such experiences. Programs that require assistantship experiences in a school system may be directed toward research training that copes with an entirely different set of problems than is the case if the experiences are contained in a university department. Where the information was provided, the locus of experiences was analyzed and is reported in Table 110.

The doctoral training programs were also analyzed to ascertain what roles the participants were being prepared to fill. Some programs identified multiple roles for which persons were being prepared; others identified only one role. These roles are listed in Table 111.

Only three of 30 universities indicated that their doctoral programs were not designed to prepare researchers or professors. Those three programs were for the preparation of research administrators and supervisors. Twelve universities listed roles in addition to the conduct of research or the professorship.

Clearly, the expectation of directors of doctoral research training programs was that the programs would prepare researchers. Very likely these programs will increase the number of educational research personnel. At least overt efforts were being made to prepare researchers.

TABLE 110. LOCUS OF NON-COURSE COMPONENTS OF DOCTORAL RESEARCH TRAINING PROGRAMS

Agency	Number of Programs		
	Listed as usual locus	Listed only as possibility	Total
University Department	15	5	20
University Research Agency (Laboratory, Center, or Institute)	14	7	21
Public Schools	7	7	14
State Education Department	1	3	4
Educational Laboratory or Other Research Agency	4	7	11

TABLE 111. ROLES FOR WHICH PARTICIPANTS IN DOCTORAL RESEARCH TRAINING PROGRAMS WERE BEING PREPARED

Role	Number of programs preparing persons to fill role
Preparation to Conduct Research	30
Preparation to Administer and Supervise Research	10
Preparation to Be Professor of Research	4
Preparation to Be Professor (Research not listed)	10
Preparation for Development and Adaptation of Measurement and Evaluation Procedures	1
Preparation of Staff Members for Publishing Houses	1
Preparation of Staff Members for Testing Agencies	1
Preparation to Be Consultant	2
Preparation to Be Curriculum Developer	2

However, these programs seemed little different from programs of the past. Participants had already established careers in educational practice, and historically the job of transformation to a research career has been difficult. One promising observation from Sieber's data was that Title IV participants expected to receive the doctorate 6.8 years sooner than did the 1964 doctorates in education (anticipated age at receipt of doctorate of Title IV participants was 31.4 years; 1964 education doctorates averaged 38.2 years of age).[12]

Sieber's concern that Title IV participants would not be well grounded in a non-educationist discipline may not be as great a problem as he surmised. His concerns grew from the fact that he found that 76 percent of the graduate programs were administered by schools of education and an additional eight percent were administered by state departments of education or school districts. The wide range of substantive fields of training programs noted in Table 107 seems to indicate that a context of the disciplines has not been forgotten. A more pressing concern, assuming that a reasonable proportion of the trainees become researchers, is whether or not they will research educational problems.

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[12] Sieber, _Analysis of USOE Research Training Programs, 1966-1967_, _op. cit._, p. 76.

Terminal Master's Degree Programs

Six Master's degree programs were described. The designation of "terminal" does not mean that participants cannot continue for the doctorate; the implication is that these programs are self-contained and prepare persons for research roles without further training. These programs are summarized in Figure 4.

Undergraduate Programs

Six undergraduate research training programs were described. These are summarized in Figure 5.

Only 17 of the 177 first year awards of Title IV training programs were at the undergraduate level. The six described in Figure 5 were all appended to teacher education programs. Undergraduate schools and colleges of education have traditionally had a single mission--the preparation of teachers. Since graduate research training programs draw from manpower pools in education, they inevitably attract persons who are trained and experienced in teaching. Frequently these research recruits have prepared at the Master's degree level for still another role--counseling or administration. Thus, the revamping of career patterns is a nearly unmanageable task of graduate research training programs.

Possibly the greatest return on investment of funds and energy for attacking R, D, and D manpower shortages,

Program purpose	Duration	Core courses	Research courses	Research experiences
To prepare educational researchers with competence in research on the teaching-learning process	Two years in residence	Philosophy of Education, Social Foundations of Education, Curriculum Analysis, Advanced Educational Psychology, Learning, and Motivation	Educational Research, Professional Seminar, Mathematical Statistics, and Psychological Testing	Thesis Research practicum each semester (15-20 hrs. per week) a)Work with faculty on projects b)Apply statistical concepts to research problems c)Synthesize and explore research problems d)Participate in research design
To prepare persons for educational research positions and for further graduate work	One year	Concentration on research area	Emphasis in this area-including research techniques; statistics	Placement in the R, D, and D division of a local school system Weekly seminar Weekly meetings with supervisor of field experiences
To train technicians in educational research	One academic year, plus two summers	Social Foundations of Education, Psychology of Learning and Thinking, Analysis of Teaching-Learning Process	Introduction to Educational Statistics, Intermediate Educational Statistics, Psychological and Educational Measurement, Machine Data Processing, Introduction to Educational Research, and Research Methods	Research Internship and Field Seminar Students assigned to Educational Research Agencies for two quarters, supervised by agency staff and university faculty. Seminars used to integrate experiences

FIGURE 4. SUMMARY OF RESEARCH TRAINING PROGRAMS--MASTER'S LEVEL

Program purpose	Duration	Core courses	Research courses	Research experiences
To develop research competency in an area relating body type, composition, anthropometric assessment, and physical performance measures	One year	Not described	Not described	Not described
To train educational researchers to fill school research positions	Six quarters	A substantive area, learning, teaching, reading, perception, development, motivation, cognition and program learning	Introduction to Educational Statistics, Fundamentals of Research, Advanced Educational Statistics, Laboratory Techniques, Tests and Measurements or Theory and Technique of Measurement and Scaling	Practicum in Research
To prepare persons for educational research positions	One calendar year	Not described	30-40 clock hours in computer use (non-credit) Bi-weekly day long seminars (non-credit) conducted by invited experts in various research areas 3 credit hours of seminar in problems in school research including statistics, measurement, and research methodology	One day per week on research project in local public schools (university personnel supervise and consult)

FIGURE 4 (continued)

Program purpose	Undergraduate substantive program	Special features	Program level	Research courses	Program period	Number of students	Practicum
Orientation to Research; Preparation for Graduate Study	Teacher education	Student teaching as part of program	Upper division	Fundamentals of Educational Research (2 courses)	Summer and following senior year	10	Working with individual professors
Orientation to Research; Preparation for Graduate Study	Teacher education	Not described	Upper division	Educational Tests and Measurement (2 courses) Introduction to Educational Statistics (2 courses)	Academic year, plus summer	15	Teams of five working on each of three funded research projects
Orientation to Research; Develop Research Competencies	Teacher education or non-education	Not described	Seniors	Introduction to Educational Research; Educational Statistics; Educational Measurement and Evaluation	Academic year plus summer	14	Independent study, and participation with faculty in a research activity
Orientation to Research; Develop Research Competencies	Teacher education or non-education	Practice teaching must have been completed	Seniors	Basic Concepts of Measurement; Experimental Design; Data Analysis; Research Literature in Education	Academic year plus summer	15	Independent research project

FIGURE 5. SUMMARY OF RESEARCH TRAINING PROGRAMS - UNDERGRADUATE LEVEL

Program purpose	Undergraduate substantive program	Special features	Program level	Research courses	Program period	Number of students	Practicum
Develop Specialized Research Competency in an Area Relating to Body Type, Composition, Anthropometric Assessment and Physical Performance Measures	Physical education	Not described	Seniors	Seminar	Academic year	3	Participation in project studies, and individual study
Orientation of Prospective Teachers to Inquiry Methods; Recruitment Pool for Graduate R, D, and D programs	Teacher education	Undergraduate minor in educational research	Upper division	20 quarter hour sequence over a four quarter period rather than individual courses; 10 quarter hours of elective courses. Sequence includes (1)nature and function of inquiry, (2) problem conceptualization, (3) research awareness, (4) research skills, (5) research report writing, and (6) occupational opportunities in R, D, and D	Academic year plus summer	30	Working with faculty members on research projects

FIGURE 5 (continued)

would be at the undergraduate level. The establishment of undergraduate educational research training programs apart from teacher training would (1) supply persons on graduation for some important roles, and (2) prepare persons for immediate entrance into graduate training without the usual career conflict. Further, those who go straight through to the doctorate would enter the profession at an age considerably younger than present norms.

Short Term Institutes

Thirteen short-term institutes for research training were described. These are summarized in Figure 6.

Obviously, the most expeditious way to combat manpower shortages in specific R, D, and D areas is through short-term, inservice institutes. The improvement of existing operational programs in school systems and other educational agencies (institutional research) may depend on these short-term institutes. In the programs described in Figure 6, there seemed to be a preoccupation with classical techniques and training in proposal preparation. There may have been an overemphasis on textbook methodology, where case analyses, simulation, or practica would have been relevant.

Summary and Conclusions

This report has analyzed 57 research training programs located at 47 educational institutions. These

Program purpose	Length of program	Number of participants	Level of program	Analysis of program
To orient education leaders to the use of research in school settings	Three, three-day sessions over five-month period	60	Post-master's non-credit	Research process, measurement, statistical analysis, problem development and solution, and research information
To enhance understanding of research and improve research skills	Three hours, one day per week over five-month period	33	Non-credit	Problem identification, proposal development and design, and statistical tools
To prepare persons who will assume research positions following institute	Six-week summer program	30	Graduate credit	Statistics, computer programming, and research design
To prepare educational research administrators to use management information systems (specifically, PERT)	One-week session (four sessions during year)	25	Non-credit	Management concepts and principles, principles of PERT, concepts and principles of scheduling, report writing, and resource allocation.
To provide research training for administrators and staff members of junior colleges	Six-week summer program	18	Non-credit	Statistics, educational research methodology, development of proposals and evaluation instruments
To prepare school administrative personnel to formulate, perform, and/or direct institutional research in school setting	Three, four-week sessions	30	Undergraduate or graduate credit	Content divided into: Research proposal and report, curriculum research and development, curriculum evaluative paradigms and procedures, techniques for analyzing and interpreting experimental data, and using "Instructional Packages"

FIGURE 6. SUMMARY OF RESEARCH TRAINING PROGRAMS--SHORT TERM INSTITUTES

Program purpose	Length of program	Number of participants	Level of program	Analysis of program
To train educational research workers in basic analytical techniques particularly statistical analysis	Ten-week summer program (One, six-week term One, four-week term)	31 1st term 22 2nd term	Graduate credit	Statistics, ranging from descriptive through factorial experiments
To equip educational administrators with necessary research competencies to exercise effective leadership in educational research activities	Two-week workshop	25	Not specified	Basic concepts of educational research, experimental design, non-experimental research, organization of a research project, and reading and writing research reports
To equip experienced school personnel with tools and understandings for conducting research in school settings	Eight-week summer program	45	Graduate credit	Development of research-types, mechanics, and tools of research; review of significant research, and study of sources of research support
To prepare public school personnel for evaluating Title I projects	Eight-week summer program	30	Graduate credit	Statistics, research design, instrumentation for culturally disadvantaged, curriculum change and evaluation
To provide research skills to plan a research project to be carried out the subsequent year	Six-week summer program	20	Graduate credit	Program designed individually for each student including research design, scientific method, sampling, and related topics

FIGURE 6 (continued)

Program purpose	Length of program	Number of participants	Level of program	Analysis of program
To provide research training for school superintendents and other administrative officers having responsibility for federal Research projects	Four-week summer program	13	Graduate non-credit	Research methodology, research design program evaluation, and research writing.
To provide training in research data processing and PERT for state department personnel	Four-week program split into two, two-week sessions	19	Graduate credit	Measurement, design, program evaluation, PERT, automatic data processing, and ERIC

FIGURE 6 (continued)

programs were at the post-doctoral, doctoral, master's, undergraduate, and in-service levels.

Programs for improving and extending educational knowledge were at the post-doctoral and doctoral levels, whereas programs for improving educational practice were usually short-term, in-service institutes. Master's level and undergraduate programs had the potential of being addressed to both objectives, but were used rarely.

Quantitatively, current research training efforts are falling far short of any significant inroads on demands. Qualitatively, the programs look like traditional programs with a heavy emphasis on the methods of experimental psychology. The promising feature is that overt efforts are being made to train researchers in education rather than assume that research training is a by-product of preparation for professional practice.

APPENDIX H

SOME IMPEDIMENTS IN MOUNTING EFFECTIVE EDUCATIONAL RESEARCH TRAINING PROGRAMS[1]

This paper is designed to examine logically, and empirically where data exist, impediments to mounting effective educational research training programs which manifest themselves in terms of:

1. Academic and professional traditions in education
2. Institutional and organizational arrangements for research training
3. Characteristics of research trainers
4. Characteristics of research trainees

Academic and Professional Traditions in Education

The fact that, traditionally, colleges of education have not produced large numbers of researchers in education--those who extend and improve educational knowledge--should not be a surprise to anyone. The mission of colleges of education has been to prepare professional practitioners--teachers, administrators, counselors, supervisors, and other specialists. Shortages of these professionals have been severe, and demands on resources of education colleges have been intense. Even so, lack of time and resources for research training may not be as relevant in explaining the condition of research training as is the tradition of professional colleges in the university setting. Colleges of law do not typically prepare researchers; rather, they look to departments such as political science and government to do that job for the profession. Colleges of medicine do not typically prepare medical researchers; rather, they look to physical and biological sciences departments for that task. Engineering colleges have generally followed similar patterns. In like manner, colleges of education have looked to the social and behavioral science departments, especially psychology, for preparing educational researchers.

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[1] This appendix was prepared by Arliss L. Roaden, Professor of Education at The Ohio State University.

The problem with this arrangement for education is that the social and behavioral sciences have not accomplished the job. These sciences have themselves been struggling for identity and especially for appropriate and productive investigative methods. For the most part, these sciences have origins in the discipline of philosophy which was slow in acknowledging empiricism in any form.

Perhaps in a spirit of rebellion, behavioral scientists have turned to the physical sciences for a methodology of inquiry. At a time when the physical sciences were questioning the hardness of their empiricism,[2] the behavioral and social scientists were committed to the methodology, and there has been little tendency to deviate from the traditions of the physical sciences.

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[2] For example, in 1950, Percy Bridgman, the physicist who reflected on his science, described as revolutionary the new awareness of physicists that "it is impossible to transcend the human reference point." Bridgman, P.W., "Philosophical Implications of Physics," American Academy of Arts and Sciences Bulletin, vol. 3, no. 5, February, 1950. Mathematician Jacob Bronowski called to our attention that "we live in a technical age of plenty and are frightened because we try to control this abundance by a morality

The training of researchers in education has been in the scientistic mold of experimental psychology that has not yielded necessary improvements in educational knowledge or practice.[3]

Now that there are some indications that colleges of education are beginning to assume responsibilities for training researchers, other traditions constitute severe impediments. Undergraduate colleges of education have had a single purpose, that of preparing teachers. Graduate schools of education have assumed responsibilities for training other educational specialists such as superintendents, principals, and counselors. The flow of students into graduate specialties has been from the pool of persons who had previously been trained in undergraduate programs

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which shuts its eyes to the consequence of our acts. We are simply not thinking through to the end the implications of the changes that we are making in our lives and in the lives of other nations." Bronowski, Jacob, "A Moral for an Age of Plenty," The Saturday Evening Post, 233:72, November 12, 1960.

[3] Louis T. DiLorenzo noted that the 85 ESEA Title IV programs which he studied in 1967 were dominated by a psychological approach, and that 40 percent were headed by specialists in psychology: DiLorenzo, Louis T., Appraisal of ESEA Title IV Graduate Research Training Programs, Special Project Memorandum to John D. Colby, United States Office Of Education, Washington, D.C., June 15, 1967.

to be teachers. These natural impeding circumstances of a pool of persons for graduate specialty training are compounded by the design of the graduate programs. Graduate admission requirements usually specify that applicants be certified teachers and that they have teaching experience. Thus, the tradition is that anyone who does anything in education must come from teacher education training programs. In addition to limiting the number of persons available for non-teaching specialties, this tradition introduces the compounding impediment of career change on the part of each specialist who first planned a teaching career.

Apart from the conflict in career preparation (i.e., preparation for teaching and preparation for another specialty/ies), there is the expectation of teaching experience prior to preparation for another specialty. Recruitment, then, is from those who have tried teaching and do not like it or from those who have tried teaching and do like it. In the first instance, preparation for another specialty in education may be a flight from dissatisfaction with teaching to dissatisfaction with another role in education. In the latter circumstance, reward systems are already at work in teaching, and the attempt to attract these persons to other specialties is difficult, possibly fruitless. Assuming success in attracting happy, successful teachers to another specialty, happiness and success in the other specialty is far from being obvious.

In summary, the training of educational researchers in graduate schools of education is faced with the following traditional impediments:

1. There has been no expectation that colleges of education should prepare their own researchers.
2. The dependence on other university departments has been misplaced. They have not accomplished the job. The social and behavioral sciences have been trying to establish their own identity and to develop appropriate methodologies of inquiry. Further, there has been a tendency for blind reliance on traditional methods of the natural sciences.
3. The recruitment of persons for training in educational research has been from persons already trained to be teachers. Thus, the pool for recruitment is limited, and career patterns are already established.

An appropriate question at this point is what are the possibilities or probabilities that these traditions will be changed? The prospects are not promising in the immediate future. Specialist preparation programs are geared to meet state certification requirements which are set by the educational community. Increasing militancy on the part of the educational community may crystallize the mandate that all specialists in education must come from the teaching ranks. Further, college professors of education are caught up in the traditions. Having been there (i.e., teaching in the schools) is usually a requirement of institutions employing professors; thus, the professors extol career patterns similar to their own. Without arguing the merits or demerits of teaching experience for superintendents, principals, counselors, and other specialists in the schools, the task is to present educational research as a unique specialty. The burden of articulating the uniqueness rests with the university professors who must advocate the virtues of career patterns different from their own. The fact is, they have been disinclined to deviate from tradition.

Institutional and Organizational Arrangements for Research Training

The training of researchers in education in university settings is fraught with problems that older, more established disciplines have faced and have not solved. Traditionally, universities have faltered on clarity of purpose with respect to that which is basic and that which is applied. This question is fundamental to the more popular debates of primacy among the tasks of research, teaching, and service. Most academicians agree that universities should concentrate on fundamental questions and issues. But how fundamental is fundamental? Not a long time ago, departments of theology, and later departments of philosophy were the strongest departments in higher education. A general intolerance for problems and issues related to the application of knowledge prompted the secession from philosophy of such departments as political science, sociology, anthropology, psychology, and education. The establishment of these separate departments was prompted by a move toward the application of knowledge. However, within these departments debate regarding the efficacy of basic and applied is still being waged.

To the chagrin of many academicians, the tendency is increasing for universities to respond to outside calls for help. Gould observed that outside financial support can place almost anything into the university system. The new role of service to the public, he noted, is being emphasized in our universities today, and this new role represents the loss of another degree of autonomy.[4] Of special concern have been demands on the university from Federal government, with government funds supporting 70 percent of academic research and 20 percent of university budgets.[5] Service to the public, it is feared, will cause universities to become responsive to the public at the expense of traditional autonomy. If the public pays for its services, what controls will be established by the public on its service men? Quality control is being called for by Congress on services for which it is contracting. William D. Carey of the Bureau of the Budget noted that, "If science, which thrives on uncertainty, thought its liaison with Government would be risk free, it flunked Politics I." The relevant question is whether science can be administered. "If we decide that it can be administered," Carey observed, "then we must face up to the liklehood that Government will do the administering because it has bought up all the stock."[6] The invitation to universities with regard to the basic and applied question is stated succinctly by Kash:

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[4] Gould, Samuel B., "The Modern Univeristy: Concerns for the Future," Science 155:1511-1514, March 24, 1967.

[5] Brooks, Harvey, "Science and the Allocation of Resources," American Psychologist 22:187-201, March, 1967.

> Our universities not only are being asked to respond to perceived problems, but also to help perceive problems. No demands are being made that universities get out of the basic research business. Rather, the demand is that the universities take on in addition a larger share of responsibility for applying the basic research to practical needs.[7]

The fear of applying research to practical needs in the civilian sector is not simply a matter of university autonomy; a more basic fear is that the university will get scorched in the process. Natural scientists have long believed that they can do basic research on weaponry for the Department of Defense without involvement in the public policy that makes weapons necessary. If this has been a valid position for the natural scientist,[8] the social scientist can make no such claims, when he is called on to develop knowledge about public policy and to apply his knowledge to practical needs. For example, a diagnosis of educational deprivation in the core of our cities challenges colleges of education not only to conceptualize an appropriate policy, but to supervise, at least, administration of the treatment. Such actions tread on dangerous political grounds.

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[6] Carey, William D., "Passing Thoughts on Science and Resource Allocation," American Psychologist 22:202-204, March, 1967.

[7] Kash, Don E., "Research and Development at the University," Science 160:1314, June 21, 1968.

In this context of institutional uncertainty about their mission, colleges of education are inaugurating programs of research and of research training. Education as a science of practice has long been the object of

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[8] This posture of ethical neutrality in science dates back to Roger Bacon. No doubt, a feeling of neutrality provides comfort to the scientist who is engaged in weaponry research. However, this position for even the most basic researchers has been challenged. Jacob Bronowski, in a scholarly treatise on the subject, concludes with the following observation:

> Perhaps the techniques of science can be praced for a time without its spirit, in secret establishments, as the Egyptians practiced their priestcraft. But the inspiration of science for four hundred years has been opposite to this. It has created the values of our intellectual life and, with the arts, has taught them to our civilization. Science has nothing to be ashamed of even in the ruins of Nagosaki. The shame is theirs who appeal to other values than the human imaginative values which science has evolved. The shame is ours, if we do not make science part of our world

critical scruitiny by academic purists.

The uncertainty of colleges of education within the university can and is being coped with as universities adjust their missions. It is within the colleges of education themselves that obfuscation of mission is the most serious impediment to training researchers. Teaching and service have long been recognized as important tasks; the advent of research as a task has meant adjustment of the traditional tasks that has not been painless. Students of research training all stipulate the necessity for training researchers where research is being done.[9] To learn it is to see it being done and to do it. To train researchers and install research activities in colleges of education at the same time is a chicken-and-egg problem. A chief reason why research training must be done

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intellectually as much as physically, so that we may at last hold these halves of the world together by the same values. For this is the lesson of science, that the concept is more profound than its laws and the act of judging more critical than the judgment. (Bronowski, Jacob, Science and Human Values, Harper and Brothers, New York, 1956, pp. 93-94.)

[9] Buswell and his associates observed that among the 1954 doctoral graduates in education, those who became productive educational researchers had been research assistants in research bureaus. (Buswell, Guy T., et al., Training for Educational Research, CRP no. 51074., Center for the Study of Higher Education, University of California, Berkeley, 1966).

where research is being conducted is the necessity for research apprenticeships for the trainees. The current state of curricula for research training is in disarray; however, there is uniform agreement as to the essentiality of apprenticeship experiences.

To the extent that members of the American Educational Research Association depict a cross-section of the educational research community,[10] it may be concluded that research apprenticeships are more of a "talked-up" virtue than a virtue that is actually practiced. Currently, a study is underway to construct a taxonomy of apprenticeship experiences, and to test the utility for research training of apprenticeship sub-components.[11] A preliminary step in that study was to identify active and associate members of AERA who held a research assistantship during their academic studies. Only 43 percent (1,710 of 3,963 respondents) of this group who identify themselves professionally with the research community had been research assistants during their academic studies.[12]

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[10] AERA does not seem to represent comprehensively the publishers of research articles. A check of authors of research articles in eight educational research journals for each of the years 1966, 1967, and 1968 revealed that only 29 percent, 28 percent, and 28 percent for the respective years were represented on the AERA active and associate membership lists. Worthen, Blaine R., The Impact of Research Assistantship Experience on the Subsequent Career Development of Educational Researchers, Unpublished dissertation, The Ohio State University, Columbus, 1968, p. 81.

[11] Ibid., pp. 116-117.

The faith that has been placed in research assistantships as a training strategy seems not to have been tested fully. The relationship of research assistantship experiences during training programs to research productivity was tested empirically by Buswell[13] and by Worthen[14]. In both cases the relationship was significant. Worthen attempted to sort out genuine from ersatz research assistantship experiences and found only the genuine experiences to be significantly related to research productivity. Those who had experiences that were called research assistantships but were not in reality research-related were no more likely to be productive researchers following their training than those who had no assistantship experiences. Of rather serious implications is the fact that those who held both a genuine and an ersatz research assistantship were negatively influenced by the ersatz experience.

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[12] Sieber noted in his study of schools and colleges of education that intensive research preparation through project internships is provided to approximately five percent of the graduate students in education. Sieber, Sam D., The Organization of Educational Research in the United States, CRP no. 1974, Bureau of Applied Social Research, Columbia University, New York, 1966, 364 pp.

[13] Buswell, Guy T., et al., op. cit.

[14] Worthen, Blaine R., op. cit.

There seem to be at least three serious impediments to a reliance on research assistantships for training researchers. First, even gross differentiations of productive apprenticeship experiences from non-productive, even damaging, experiences are rarely made. Second, there is not enough research going on in colleges of education to which students may be assigned as apprentices. Third, only a very few students can be apprenticed to the few productive researchers who are available. So long as research assistantship experiences are in vogue for training researchers, quantitative production of educational researchers is impossible. Another implication is the likelihood that ersatz assistantships will multiply and ineffective training programs will likewise multiply.

Two alternatives to these pessimistic projections can and must be effected. First, there is the need to sort out with great precision effective apprenticeship experiences from non-effective apprenticeship experiences.[15] If this sort-out can be made, the time which students are apprenticed to productive researchers may be shortened, to the benefit of both students and researchers. A second task that must be done is refinement and improvement of the non-apprenticeship components of research training programs. So far, the number of research courses one takes during training has not been reflected positively in greater research productivity. The production of research training materials[16] and the refinement of course work seem to be over due.

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[15] Worthen and Roaden currently have such a study underway, sponsored by Phi Delta Kappa.

Another category of impediments for training educational research personnel lies within the established patterns of academic programs in colleges of education. Programs are broken into distinct components separating the baccalaureate program from the Master's, and the Master's from the doctor's. Many programs are further separated between the Master's and the doctor's by a specialist's program. Within graduate programs are a series of patterns for fulfilling certain certification requirements. The pattern is a linear one with a series of terminal points rather than a vertical one leading from initial college entrance to the doctorate.

This organizational system is designed for the preparation of practitioners rather than researchers; indeed the system mandates against preparing researchers. Since undergraduate programs in education have a single purpose, that of preparing teachers, a student's professional and academic objectives are achieved at the conclusion of the baccalaureate program. The motivation to go to graduate school usually comes from successful teaching performance, and then the motivation is to complete a Master's degree. Motivation for the doctorate usually comes after successful performance in whatever specialty followed the Master's degree program.

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[16] The Southwest Regional Laboratory has done some noteworthy work in educational research materials production.

Brown, in his study of 1964 doctoral graduates in education, found that only 5.4 percent of the 2,067 respondents first considered a doctoral degree before they entered college, and only 12 percent first considered one during undergraduate studies.[17] Respondents were invited to indicate from among 14 alternatives positive personal motivations for their decision to enter a doctoral program. Three reasons cited most frequently as highly important were (1) "opportunity for greater self fulfillment," (2) "desire to achieve maximum development of your academic talents and abilities," and (3) "desire to become a better practitioner of your profession." The single reason cited least frequently as highly important was "a certain fascination with the world of research and experiment."[18] It should not be surprising that motivation for doctoral studies is attributed to the experiential world of the respondents. They are unlikely to be motivated for that with which they are unfamiliar. Educational research, as a profession, is unknown to students prior to undergraduate studies; they do not find it anywhere in the undergraduate program;[19] Master's degree programs are devoted to practitioner specialities;[20] and in doctoral programs, where professional possibilities in research are first introduced, researcher models are scarce and research training programs are ill-defined and frequently unpopular. Further, doctoral programs come at a time when practitioner careers are well established, and students are at an age when they are disinclined and ill-equipped to switch to a career without immediate feed-back of rewards and accomplishments.

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[17] Brown, Laurence D., Doctoral Graduates in Education: An Inquiry into Their Motives, Aspirations, and Perceptions of the Program, Indiana University Foundation, Bloomington, 1966, pp. 72-73.

[18] Ibid., p. 77.

An important, perhaps vital, step for improving research training is to begin research training programs at the undergraduate level apart from teacher training. Another important step is to inaugurate MAT-type programs in educational research to attract persons from other disciplines who have developed "a certain fascination with the world of research and experiment." The modular, step by step, specialty by specialty, career development programs in education must be broken if research training is to be done effectively in colleges of education. Cues can be taken from other disciplines in bypassing the Master's degree and moving directly from the baccalaureate to the doctoral degree.

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[19] A study of research training programs included in Appendix G of this document turned up only six undergraduate research training programs, and five of the six were supplemental to a teacher training program.

[20] In the study noted in footnote 19, only six Master's degree research training programs were described by respondents. Obviously there are some baccalaureate and Master's programs not reported; however, their scarcity is well established.

Just how colleges of education should be organized to enhance research and research training has been a topic of some debate. Sieber[21] called for research bureaus, and Guba[22] pointed out their pitfalls. Obviously, students in research training programs must be where the research is being done. Traditionally, students have been affiliated with instructional units where they are dependent on the faculty for survival. Researchers must be provided significant blocks of time away from heavy student instructional loads. As a consequence research training has been fraught with organizational impediments of researchers isolated from students, and students isolated from researchers. An absence of colleagueship of faculty members with primary research loads and of faculty members with primary instructional responsibilities can often deteriorate into unhealthy rivalry with students as the losers. Traditions of faculty governance of personnel rewards--rank and salaries--are exercised in a setting where researchers are obviously in the minority; and they often suffer the same indignities that minority groups are known to suffer in other settings. However, it must be noted that this problem is counterbalanced to some extent when personnel matters are reviewed on a university-wide basis, where the rewards are more generous for scholarly production. Unless colleges of education are able to learn to live with multiple purposes, the alternative may well be the establishment of institutions for preparing researchers separate and apart from institutions for preparing other specialists however undesirable such an arrangement may be on scientific grounds.

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[21] Sieber, _op_. _cit_., pp. 343-344.

[22] Egon G. Guba, paper presented at 1966 Annual Meeting, American Educational Research Association.

Characteristics of Research Trainers

Further elaboration of the fact that faculty members in colleges of education are not, as a group, exemplary research scholars would border on masochism. There are, however, other research training impediments associated with the nature of the faculty that can be noted.

First of all, faculty members of any description are in short supply. The annual production of doctorates is now about 2,500. They, for the most part, are joining college faculties. Fifty-six percent of the 1964 doctoral graduates were employed by colleges and universities, and another 12 percent had aspirations for entering college or university positions.[23] Of those employed by colleges and universities, 41.6 percent are employed by doctoral producing institutions, and 21.9 percent work entirely or almost entirely with graduate students.[24]

The pattern is clear: there is a perpetuation from year to year of non-researchers working with graduate students. Of the total doctoral production of colleges of education, about 150 per year will become producing researchers.[25] Yet the doctoral producing institutions are employing 600 new doctorates per year, and assigning about 313 to work entirely or almost entirely with graduate students.

In some institutions, there is a tendency for faculty members with greater tenure to work with graduate students, where younger faculty members await their turn, sometimes several years. The bright young faculty member, with a fresh knowledge of research skills, may have lost his skills and had his enthusiasm dampened by heavy teaching demands when he eventually has the opportunity to work with graduate students.

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[23] Brown, op. cit., pp. 236-241.

[24] Ibid.

[25] Estimate derived from Sieber, op. cit., p. 337.

The advent of private educational research agencies, educational laboratories, and ESEA Title I and III programs has intensified the competition for services from the few educational researchers. Unquestionably, these agencies must be called on to share with colleges and universities the responsibility for training R, D, and D personnel.

Apart from research and research-related demands for competent research personnel, this group is also in demand for administrative and other leadership roles. Professor Anne Roe, in 1962-1963, interviewed again the eminent scientists whom she had first interviewed in 1947-1949. Fifty-four of the original sample of 64 were still living and 53 of them had become administrators.[26]

The age of faculty members in colleges of education is a major impediment. The average age of 1964 doctoral graduates in education was 38.9 years, with more of them over 50 than under 30 years of age.[27] This is the primary source of supply for colleges of education in establishing a research oriented graduate faculty. No study of age of education faculty members that can be generalized is known; however, in 1968 the writer examined the ages of 118 college of education faculty members in one multi-purpose university, and found the mean for all ranks, instructor through professor, to be 48.5 years.

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[26] Roe, Anne, "Change in Scientific Activities with Age," Science 150:313-318, October 15, 1965.

There is some conflicting data about the optimum age for peak research productivity. Lehman graphed qualitative production and quantitative production against age of psychologists.[28] His opinion and data showed the peak years for publication to be the 35-39 age group. He also concluded that this age of productivity had not changed since 1860. Stewart and Sparks studied patent records for all 89 professional men (mostly chemists and chemical engineers) in one division of a large industrial scientific organization to determine whether creativity as measured by the production of patentable ideas tended to vary with age. The results were consistent in revealing no decline in creative productivity with increase in age, and indicated instead a tendency for productivity to increase as chemists mature.[29]

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[27] Brown, op. cit., p. 39.

[28] Lehman, Harvey C., "The Psychologist's Most Creative Years," American Psychologist 21:363-369, April, 1966.

The data seem clear, however, in the critical relationship of age at time of receiving the doctorate to subsequent research productivity. Buswell noted in his study of 1954 doctoral graduates in education that persons receiving the doctorate at age 32 or younger published 61 percent more studies per person than did those age 40 or older on receipt of the doctorate.[30] Heiss found the mean age at the receipt of the doctorate of 31 distinguished scholars in education to be 28.33 years. The 22 scholars who were 29 years old or younger when they received their doctorates were responsible for 91.3 percent of the publications produced by all the 31 scholars.[31]

With a mean age of 38.9 years at time of receiving the doctorate, education graduates seemed to have already incurred a major impediment to research productivity. However, Sieber, in his analysis of Title IV training programs, found that the average age at the time of anticipated receipt of the doctorate for the research fellows will be 31.4 years, a reduction of 7.5 years from the 1964 norm which Brown reported.[32]

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[29] Stewart, Naomi, and Sparks, William J., "Patent Productivity of Research Chemists as Related to Age and Experience," Personnel and Guidance Journal 45:28-36, September, 1966.

[30] Buswell, *op. cit.*, pp. 11-15.

Characteristics of Research Trainees

High caliber graduate students can compensate for a multitude of institutional and program sins. Refinement of student recruitment and selection processes may be the single most important avenue for improving research training in education. Conversely, the inaptitude for student recruitment and selectivity in the field may be the single most serious impediment to mounting effective educational research programs. What are the characteristics of researchers? And, what are the characteristics that seem to mandate against research productivity? Sieber concluded that the most important set of factors affecting the output of researchers is recruitment policies affecting the level of student talent.[33] In his study, however, he checked only for quantitative selectivity (number of applications for admission, number accepted for admission, and number actually registered). The complex task of sorting qualitative characteristics remains. Simply cutting back on the number of graduate students accepted has hazardous probability of denying entrance into training programs to students with research potential. Espcially is this hazard likely when numbers are reduced on the basis of such criteria as (1) completion of a Master's degree, (2) holding of teaching certificate, and (3) teaching and administrative experience.[34]

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[32] Sieber, Sam D., Analysis of USOE Research Training Programs, 1966-67, Cooperative Research Project no. 7-8315, Bureau of Applied Social Research, Columbia University, New York, January, 1968, p. 76.

[33] Sieber, The Organization of Educational Research in the United States, op. cit., p. 337.

Buswell and his colleagues[35] have provided data which could be summarized to characterize a typical producer of educational research as follows:

1. He was 32 years of age or younger when he received the doctorate.
2. He had fewer than the average years of teaching experience for all education doctorates at the time the doctorate was awarded.
3. He was awarded the bachelor's degree from a university which also offered the doctorate.
4. He took fewer than the average number of undergraduate courses in education.

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[34] Moore, H. E.; Russell, J. H.; Ferguson, D. G., The Doctorate in Education (vol. II of The Institutions), American Association of Colleges for Teacher Education, Washington, D.C., 1960. (Moore and his associates reported that, of the institutions awarding doctorates in education between September, 1956, and September, 1958, 75 percent required the Master's degree for admission to doctoral programs; 49 percent required teaching certification; 55 percent required two or three years of teaching experience; and 61 percent required administrative experience.

[35] Buswell, *et al.*, *op. cit.*

5. He decided to do graduate work and to work toward the doctorate earlier than his peers who were not productive researchers but who completed the doctorate.
6. He was a research assistant in a research bureau, center, or institute during his graduate studies.
7. He owed no bills at the time of receipt of doctorate, i.e., he was debt-free.
8. He published research reports prior to receipt of the doctorate and during the first year following that.
9. Some of his published research was related to the doctoral dissertation.
10. His doctoral program was typified by a period of continuous full-time residence of 18 months or more.
11. As his first professional position, following receipt of the doctorate, he joined the faculty of a major doctorate producing university, and he continues his professional career in a major doctorate producing university.
12. On his job, he has some time, although generally 30 percent or less, designated for research.

Some of these characteristics lend themselves to the development of selection policies. One gross criterion could be strict adherence to a miximum age for admission to research training. Control of this variable would also control the years of experience and the probability of heavy financial commitments which impede the practicability of full-time residence in the program.

Apart from these obvious criteria (which should not be minimized) are the more subtle criteria which differentiate researchers from non-researchers. Numerous studies have been conducted relating I.Q. scores and scores from I.Q.-type tests to successful performance in graduate programs. Results tend, in most cases, to conclude that success begets success; i.e., successful graduate school performance is best predicted by successful undergraduate performance. Graduate schools are quite justified in placing heavy emphasis on undergraduate grade-point averages. The career pattern in education, however, seems to be predicated on successful performance in professional practice. For example, students who experience success in teaching are motivated to go to graduate school for further practitioner training. This fact is noteworthy and should be exploited fully for practitioner training. The challenge to policy-makers of student selection is to differentiate this valid criterion for professional practice from other criteria for prospective researchers.

Creativity is generally ascribed as an important characteristic of research personnel. MacKinnon and his associates at the University of California at Berkeley, have conducted extensive investigations of the characteristics of creative members of various professional groups. These groups included writers, architects, research workers in the physical sciences and engineering, mathematicians. All told, some 600 persons have participated. MacKinnon summarized the results as follows:

> "What most generally characterizes the creative individual as he has revealed himself in the Berkeley studies is his high level of effective intelligence, his openness to experience, his freedom from crippling restraints and impoverishing inhibitions, his esthetic sensitivity, his cognitive flexibility, his independence in thought and action, his high level of creative energy, his unquestioning commitments to creative endeavor, and his unceasing striving for solutions to the ever more difficult problems that he constantly sets for himself."[36]

Instruments for measuring creative potential are available to admissions officers. These instruments are sufficiently valid to give important clues for research potential. Owens and Roaden conducted a study to ascertain predictive criteria for success in Master's degree programs in education.[37] This study indicated that students who select certain graduate specialties in education may be different from students who select other graduate specialties in education. Another study was conducted to test out that possibility. The Opinion, Attitude, Interest Survey (OAIS) was administered to 120 beginning graduate students, 20 of whom had elected to specialize in one of five fields -- educational administration, elementary education, exceptional children, guidance and science education. Unfortunately, there were insufficient cases for analysis of those who designated a research specialty. Students who elected to specialize in educational administration and elementary education (many of whom were preparing for elementary principalships) scored significantly higher than the other groups on "business aptitude"; and students in educational administration scored significantly lower than three other groups on "humanities aptitude."[38] Students who enter graduate specialties in education possess varying personal characteristics which seem to motivate them to choose a particular specialty, and these may mandate against other specialties. Multipurpose graduate colleges of education must refine their selection criteria to accommodate multiple purposes. Gross selection criteria for a pot pourri of programs are not good enough for appropriate selection of prospective researchers.

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[36] MacKinnon, Donald W., "What Makes the Person Creative?" Theory into Practice 5:152-156, October, 1966.

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[37] Owens, Thomas R., and Roaden, Arliss L., "Predicting Academic Success in Master's Degree Programs in Education," The Journal of Educational Research 60:124-126, November, 1966.

[38] Roaden, Arliss L., and Owens, Thomas R., Unpublished paper, The Ohio State University, 1968.

Available evidence seems to indicate that an early decision for graduate research training on the part of the students is vital. That conclusion calls for an early introduction to research as a career. The inauguration of research training programs in undergraduate colleges of education on a widespread basis will not be easy, but such a step seems to be essential.

Summary

Many impediments in mounting effective research training programs in education are inherent in the traditional structures, policies, and practices of educational institutions. These impediments are imbedded in academic and professional traditions, institutional and organizational factors, the nature of education faculty members, and the nature of education students. Is there a way out of the morass of problems which impede the training of educational researchers? The impediments noted in this paper are not insoluble; what remains are for a few educational institutions to make a daring break from tradition and pave the way for training a new breed of educational researchers.

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